STANDARD COTTON CLOTHS
AND
THEIR CONSTRUCTION

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Standard Cotton Cloths
and
Their Construction

By

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INTRODUCTORY

The student of cotton textile manufacture has access to many published works dealing with the technic of designing and weaving. Such books, however, do not convey to the reader an adequate idea of the fabric resulting from any given weave. It is difficult for one to visualize from a design on design paper, or from a description of any particular weaving mechanism, the actual appearance of the fabric resulting from the particular design, or produced by the weaving mechanism described. Moreover the man in the mill who has to do with the weaving of the cloth from familiar particulars, and who may have a fair knowledge of designing, very often has but a vague idea of the appearance of the cloth after it has been carried through the finishing processes and is ready to go to the ultimate consumer.

Up to the present no book has appeared that gives the actual cloth samples with which to illustrate the results obtained in the fabric from using any particular design or loom mechanism, and that also illustrates by means of actual samples the cloth in the unfinished state as it comes from the loom, and the same cloth after it has been passed through the finishing processes.

This book has been published for the purpose of giving to those in the industry, and also to those entering the industry, assistance in carrying over into practical illustration the theoretical description most frequently met with. There are a number of cloths that have become sufficiently well established in the trade to be termed standard. They are in more or less demand at all times and certain trade names have been attached to them by which they are fairly well known. Sixty-four of these cloths have been selected for the purposes of this book. Samples of both the gray and finished of each cloth are given, together with the weave, wherever necessary, also harness and chain drafts, and any weaving peculiarities the cloth may have. This information should be of value to every student of cotton textile manufacture.

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Standard Cotton Cloths and Their Construction

In order to enable the reader, who may not be familiar with cloth designing and analysis, to understand clearly the terms and descriptions given in this book, a brief outline of elementary designing and analysis will be given here.

All woven cloth is made by interlacing two series of

A CORRECTION

Through error, Samples 36-36A and 43-43A are described and samples are shown under the names "Lingette" and "Himalaya Cloth" respectively.

"Lingette" and "Himalaya Cloth" are trade names, registered in the U. S. Patent Office as the property of Fred Butterfield & Co., Inc., of New York.

"Lingette" and "Himalaya Cloth" are specially constructed fabrics and are in each instance much superior to the fabrics shown and described in this book under those names and in fairness to Fred Butterfield & Co., Inc., we wish to make these corrections.

This is known as 8 x 8 design paper and always has eight rows of squares between heavy lines, both horizontally and vertically. In showing a design on such paper, each vertical row of squares represents one warp end,

while each horizontal row of squares represents one filling thread, commonly termed a pick of filling. One should learn to distinguish between the lines on design paper and the rows of squares. The lines do not represent anything, but simply serve the purpose of outlining the squares. In all cases it is a row of squares that represents the warp end or the pick of filling. In all designs shown in this book the end at the extreme left of the design will be considered as the *first end*, and the pick at the bottom of the design will be considered as the *first pick*.

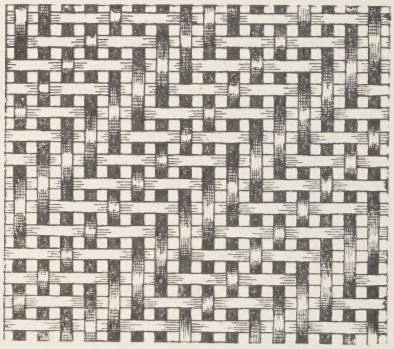


Fig. 2

Fig. 2 represents the interlacing of warp and filling to make cloth. Note that there are sixteen warp ends shown in the illustration, the warp ends running from the bottom to the top of the illustration. Also there are fourteen picks of filling shown, these filling picks extending from side to side of the illustration.

Follow the interlacing of the first end, which is the end at the extreme left of the figure. Note that it is under the first pick, which is the bottom pick, over the next pick, under the next two picks, over the next three picks, under the next two, over the next one, under the next two and over the next two, which are the two last picks of the figure.

Follow the second end in the same way. This end is under the first two picks, over the next one, under the next two, over the next three, under the next two, over the next one, under the next two, over the next one, which is the last pick.

In a similar manner the interlacing of any particular pick may be followed throughout the weave. Take the first pick, for example, which is the bottom pick. This pick is over the first two ends, under the next three, over the next two, under the next one, over the next two, under the next three, over the next two, and under the next one, which is the last end shown in the figure.

If the interlacing of the warp and filling as shown in Fig. 2, was to be shown on design paper, then sixteen vertical rows of squares on the design paper would be marked to represent the interlacing as shown in Fig. 2. When showing the interlacing of warp and filling on design paper, it is customary to have a *marked square represent warp up*, and a *blank square represent filling up*. This method will be followed in all designs shown by means of design paper.

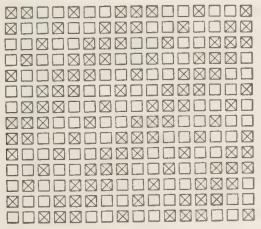


Fig. 3

Fig. 3 shows on design paper the interlacing of the warp and filling as represented by Fig. 2.

Remembering that a marked square represents warp up, read the first end of Fig. 3. It is under the first pick, over the next one, under the next two, over the next

three, under the next two, over the next one, under the next two, and over the next two, which are the last two picks. This agrees with the reading of the interlacing of the first end as shown in Fig. 2. Comparing each end of Fig. 3 with the corresponding end of Fig. 2, they will be found to agree in every case.

A *repeat of a weave* is exactly what the name implies, that is, it shows what is repeated over and over to make up the width and length of the cloth. Using Fig. 3 for an illustration, this weave repeats on eight ends and eight picks, since everything shown in this figure, outside of the first eight ends and eight picks, is simply a repetition of these ends and picks. Thus the 9th end is like the 1st; the 10th like the 2d; the 11th like the 3d; the 12th like the 4th, and so on. Also the 9th pick is like the 1st; the 10th like the 2d; the 11th like the 3d and so on. One repeat is all that it is necessary to show of any weave.

The *harness draft* is a plan showing through which harness each separate warp end of the design is drawn. Each warp end that interlaces in a different manner than other warp ends in one repeat of a weave, must be drawn through a separate harness. This is the same as saying that there always must be at least as many harnesses for a weave as there are warp ends that work differently. It does not mean, however, that more harnesses than the minimum required, cannot be used, since any number, beyond the minimum, and up to the capacity of the loom can be used. The designer always seeks to find the most advantageous number for any given weave.

When making a harness draft for a weave, commence with the first end and draw that end through No. 1 harness. If No. 2 end is different than No. 1 end then it should be drawn through No. 2 harness. If it is the same as No. 1 end then it may be drawn through the same harness as this end, or No. 1 harness. Take No. 3 end next. If this end is different than No. 1 or 2, then it must be drawn through No. 3 harness. If, however, it is like either No. 1

or 2, it may be drawn through the harness that has the end it is similar to.

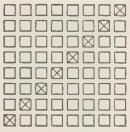


Fig. 4

Fig. 4 shows the harness draft for the weave shown in Fig. 3.

In the harness draft the rows of squares vertically represent warp ends, the same as in the case of the weave, but the *rows of squares horizontally represent harnesses*, and not picks of filling as is the case when showing the weave on design paper. The bottom horizontal row of squares represents the first harness. In the harness draft when a square is marked, it indicates that that warp end is drawn through the harness represented by the square marked.

Referring to Fig. 4, this harness draft shows that the 1st end is drawn through the 1st harness, the 2d end through the 2d harness, the 3d end through the 3d harness, the 4th end through the 4th harness, the 5th end through the 5th harness, the 6th end through the 6th harness, the 7th end through the 7th harness, and the 8th end through the 8th harness. This is what is known as a *straight draft* and always results when there are no two ends alike in one repeat of the weave, as is the case with the weave shown in Fig. 3.

The *chain draft* is a plan showing how to peg the chain that operates the harnesses in the loom when weaving. The chain draft is represented on design paper and is made from the weave and the harness draft. In the chain draft a horizontal row of squares represents a pick, the same as in the case of the weave, but *a vertical row of squares represents a harness*, and not a warp end as in the case of the weave. These differences should always be

kept clearly in mind in order to understand the relations between the weave, the harness draft, and the chain draft, when represented on design paper.

In making a chain draft from a weave and harness draft, the end of the weave that is drawn through the first harness is copied on the first vertical row of squares at the left of the design paper. This shows how the first harness is raised and lowered when weaving. The end of the weave that is drawn through the second harness, is next copied on the next, or second, vertical row of squares of the design paper. This shows how the second harness is raised and lowered when weaving. The end of the weave that is drawn through the third harness is copied on the third vertical row of squares, and so on until the number of harnesses required to produce the weave or design have been copied in the chain draft. The harness draft always shows how many harnesses are necessary, and the number of harnesses in the chain draft must agree with the number indicated by the harness draft.

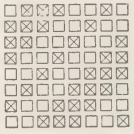


Fig. 5

Fig. 5 shows the chain draft for the weave given in Fig. 3, with the drawing-in draft as shown in Fig. 4. This weave, as stated previously, repeats on 8 ends and 8 picks, and is drawn on 8 harnesses, consequently the chain draft requires 8 harnesses and 8 picks to be shown. Referring to these figures, the harness draft, Fig. 4, shows that the first end of the weave, as shown in Fig. 3, is drawn on the first harness, consequently this end is copied for the first harness of the chain draft, Fig. 5, this being on the first vertical row of squares at the left of the design paper.

Proceeding in this manner, the harness draft shows that

the second end of the weave is drawn through the second harness, consequently this end is copied for the second harness of the chain draft. This method is continued until all the harnesses, called for by the harness draft, have been shown on the chain draft.

It will be noted that the chain draft, Fig. 5, is the same as one repeat of the weave. This is always the case when the harness draft is a straight draft, as in Fig. 4.

In order that the reader may have a better understanding of how the harness and chain drafts are obtained from the weave, when the harness draft is not a straight draft, another illustration will be given.

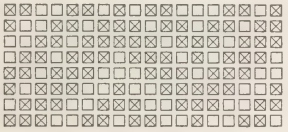


Fig. 6

Fig. 6 is a weave that repeats on 18 ends and 8 picks. It is desired to make a harness draft and a chain draft that will produce this weave in the cloth.

Commencing with the 1st end of Fig. 6, to make the harness draft, this end is drawn through the 1st harness. The 2d end, since it does not work the same as the 1st end, is drawn through the 2d harness. The 3d end of the weave is drawn through the 3d harness, since it does not work the same as either the 1st or 2d end. The 4th end of the weave, since it is unlike any one of the first 3 ends, is drawn through the 4th harness. This continues up to, and including, the 8th end, which is drawn through the 8th harness, since no 2 ends of the first 8 work alike.

The 9th end, however, works the same as the 7th end, and therefore may be drawn through the same harness as the 7th end, which is the 7th harness. The 10th end works like the 6th and is drawn through the harness with this end, which is the 6th harness. The 11th end is like the 5th

and is drawn through the 5th harness. The 12th end is like the 4th and is drawn through the 4th harness. The 13th end is like the 3d and is drawn through the 3d harness.

The 14th end is like the 12th and 4th ends and is drawn through the same harness as these ends, or the 4th harness. The 15th end is like the 11th and 5th ends and is drawn through the same harness as these ends, or the 5th harness. The 16th end is like the 10th and 6th ends and consequently is drawn through the 6th harness. The 17th end is like the 9th and 7th ends and is drawn through the 7th harness. The 18th, or last, end is like the 8th and is drawn through the 8th harness.

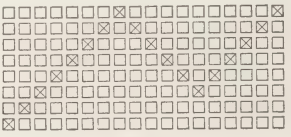


Fig. 7

Fig. 7 shows the harness draft for the weave given in Fig. 6.

The harness draft, Fig. 7, calls for 8 harnesses, consequently in making the chain draft 8 harnesses must be shown. Copy for the 1st harness any end that is drawn through this harness; for the 2d harness, any end that is drawn through this harness; for the 3d harness, any end drawn through this harness, and so on until the 8 harnesses have been obtained. The chain draft is shown in Fig. 8.

Fig. 8

The weave most commonly met with in cloths, is known as the *plain weave*. This is also the simplest of all weaves.

In this weave each end is alternately over and under a pick of filling, but two adjacent ends work opposite to each other, that is, when a certain end is over a pick of filling, the end next to it, on either side, is under the same pick of filling; on the next pick the end that was over, is now under, while the end next to it is up.

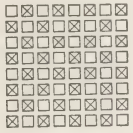


Fig. 9

Fig. 9 shows the plain weave, carried out to 8 ends and 8 picks, although it repeats on 2 ends and 2 picks, and could be shown on this number. A cloth constructed with the plain weave is usually woven with two or four harnesses. When woven on two harnesses, the ends are drawn straight 1, 2, 1, 2, 1, 2 and so on; that is the 1st end is drawn through the 1st harness, the 2d end through the 2d harness, the 3d end through the 1st harness, the 4th end through the 2d harness and so on.

When four harnesses are used the ends may be drawn straight 1, 2, 3, 4 in which case the harnesses work in exactly the same order as the ends are shown in the weave.

Fig. 10

This order is shown in Fig. 10, which gives the lifting and lowering of the harnesses for a plain weave, with the ends drawn on four harnesses, using a straight draft, 1, 2, 3, 4.

Again, in the case of four harnesses being used for the plain weave, the ends may be drawn 1, 3, 2, 4, that is, the

1st end is drawn through the 1st harness, the 2d end through the 3d harness, the 3d end through the 2d harness and the 4th end through the 4th harness. At this point the draft repeats. This is known as a *skip shaft draft*, and the order of working for the harnesses, when weaving plain cloth, and using the 1, 3, 2, 4 harness draft, is shown in Fig. 11.

Fig. 11

Four harnesses are used in weaving plain cloth, in order to avoid overcrowding the ends in the harnesses. Plain cloths of fairly high sley require 4 harnesses and when woven on a cam loom with cotton harnesses, the skip shaft draw is most generally used and the 2 front harnesses are fastened together and work as one, also the 2 back harnesses are fastened together and work as one. This method of drawing in the ends causes less wear on the harnesses in the weaving process, and off-sets the disadvantage caused the weaver, owing to his having to draw in his ends by the skip shaft method.

This does not apply to wire harnesses, and when weaving a plain cloth on 4 harnesses, and using wire harnesses, the straight draw is customary.

All cloths shown in this book, and which are constructed with the plain weave, will not have weave, harness draft, or chain draft, shown for them.

The number of warp ends per inch in a cloth is known as the *sley* of the cloth. Thus, a cloth may be said to be a 48 sley cloth, meaning that it has 48 warp ends to an inch.

The number of filling picks per inch in a cloth is known as the *pick* of the cloth. Thus if a cloth is spoken of as being 56 pick, it means that there are 56 picks per inch.

When indicating the sley and pick of a cloth, the num-

ber indicating the sley is always written first. This is generally followed by the multiplication sign, after which is put the number indicating the pick. Thus if a cloth is said to be 64 x 60, it means that the cloth has 64 ends and 60 picks per inch.

All cotton yarn is numbered from a system which has as its base what is known as the *hank*. A hank is 840 yards when dealing with cotton yarn. The number of hanks of any particular cotton yarn required to make up a pound, is the number, or count, of that yarn. Thus, if it takes 30 hanks, or 30 x 840 yds., of a yarn to weigh one pound, then that yarn is a No. 30, usually written 30^s.

The weight of cotton cloth is usually indicated by giving the number of running yards to the pound. Thus, if a cloth is said to be a 7 yd. cloth, it conveys the information that 7 yards of that particular cloth, and of the width woven, are required to make one pound.

In some cases the number of square yards to the pound is stated, but in such cases it is made plain that square yards, and not running yards, are being dealt with.

When indicating the construction of standard cloths, the width, sley, pick and yards per pound are generally given. Thus, the construction of a cloth may be shown as follows:—

40″ 88/80 8.50

This would indicate that the cloth is 40″ wide, contains 88 ends per inch, 80 picks per inch, and weighs 8.50 yds. to the pound.

With the foregoing explanations, the reader should not have any difficulty in understanding the technical terms met with in the description of the cloths dealt with in this book.

SAMPLES 1 AND 1-A

Kind of cloth	Tobacco Cloth
Width—Gray—36″	Finished—36″

Sley—28 Pick—24
Warp Counts—30^{s} Filling Counts—43^{s}
Weight of cloth—15 yds. per lb.
Selvage—2 per eye—4 per dent—6 dents.
Weave—Plain weave, woven on 2 harnesses.

Tobacco cloth is used very largely for the following purposes; for covering tobacco plants, flower plants, and fruit trees; hospital gauze; wrapping brooms; meat packing; re-inforcing paper; book binding; netting.

Many different constructions of this cloth are made, as is shown by the following list.

Width	*Sley*	*Pick*	*Weight*	*Width*	*Sley*	*Pick*	*Weight*
36	20	12	23.50	36	36	32	11.20
36	20	14	22.	36	36	32	10.50
36	20	16	19.	44	36	32	8.50
36	22	18	21.	28	40	28	13.50
36	24	20	17.	39	40	28	9.20
36	26	22	16.	25	40	32	14.75
36	28	24	15.	31	40	32	11.40
27	28	24	17.50	36	40	32	10.20
36	32	24	13.50	39	40	32	9.20
36	32	28	13.	40	40	32	9.10
36	32	28	12.	43	40	32	8.25
27	32	28	15.40	25	40	36	14.
32	32	28	13.50	27	40	36	12.15
39	32	28	11.	36	40	36	9.65
40	32	28	10.	37	40	36	9.38
42	32	28	10.50	36	40	40	9.20

In weaving this cloth care should be taken to prevent the ends from running together, also the picks. Adjusting the whip-roll of the loom, also drawing the ends one per dent in the reed, will help to keep the ends separated in the cloth, while having the take-up motion take up but one tooth each pick will help to keep the picks separated.

The harnesses should be set level when the reed is very near the fell of the cloth; and when the front harness is up, the loom should pick from the side that has the eye of the shuttle next to the picker.

The cloth is woven without temples, in order to prevent frayed selvages. For the same reason sand rollers and warp beams must be true. If the selvages become tight during weaving, the cloth roll should be moved slightly in order to prevent the selvage building up in one place. On the other hand, if the selvage becomes slack during weaving, allow a few thicknesses of cloth or paper to be wound up with the selvage on the cloth roll. The filling used in low count constructions, such as sample 1, should have less twist than filling ordinarily found in cloths of higher counts. The more twist there is in the filling, the greater is the tendency of the filling to draw the cloth in from the selvages when laying the cloth out flat, or in folding.

SAMPLES 2 AND 2-A

Kind of cloth	Cheese Cloth
Width—Gray—36″	Finished—36″
Sley—44	Pick—44
Warp Counts—30^s	Filling Counts—40^s
Weight of cloth—8.40 yds. per lb.	
Selvage—2 per eye—4 per dent—6 dents.	
Weave—Plain weave, woven on 2 harnesses.	

Cheese cloth is used largely for wrapping cheese, butter and meat; sugar and salt bags; book-binding; bunting; curtains; rubberized goods.

Many different constructions of this cloth are also made, some of these constructions being as follows:—

Width	*Sley*	*Pick*	*Weight*	*Width*	*Sley*	*Pick*	*Weight*
25	44	36	13.25	36	44	44	8.40
36	44	36	9.20	27	44	44	9.50
38.5	44	36	8.50	36	44	44	8.10
28	44	40	11.25	38.5	44	44	7.65
30	44	40	10.50	36	48	40	8.10
32	44	40	10.	36	48	44	7.75
36	44	40	8.50	29	48	48	9.70
38.5	44	40	8.20	31.5	48	48	8.70
42	44	40	7.60	40	48	48	7.
44	44	40	7.25	42	48	48	6.70
33	44	42	6.15	44	48	48	6.40

SAMPLES 3 AND 3-A

Kind of cloth — Print Cloth
Width—Gray—38″ — Finished—36.75″
Sley—64 — Pick—60
Warp Counts—30^{s} — Filling Counts—40^{s}
Weight of cloth—5.75 yds. per lb.
Selvage —2 per eye—4 per dent—6 dents.
Weave—Plain weave, woven on 2 harnesses.

Print cloths are made in a large variety of constructions, and form an important part of cotton textiles. The cloth in its various constructions is adapted to a large number of uses, both in the printed and unprinted state. Some of the uses of print cloth are the following:—

Women's and children's waists and dresses, aprons, shirts, underwear, night clothes, handkerchiefs, rubberized goods, draperies, book binding, artificial leather, buntings, flags, meat coverings, bags.

Some of the more important constructions are as follows:—

Width	*Sley*	*Pick*	*Weight*	*Width*	*Sley*	*Pick*	*Weight*
27	64	56	7.85	38.5	64	64	5.15
28	64	56	7.50	39	64	64	5.
38.5	64	56	5.50	40	64	64	7.
27	64	60	7.60	38.5	60	52	6.
28	64	60	7.30	38.5	64	52	5.75
32	64	60	6.50	44	64	64	4.50
34	64	60	5.75	44.5	64	64	4.45
35	64	60	5.75	48	64	64	4.25
38.5	64	60	5.35	51	64	64	4.
39	64	60	6.25	57	64	64	3.55
44	64	60	4.65	60	64	64	3.40
28	64	64	7.	62	64	64	3.22

SAMPLES 4 AND 4-A

Kind of cloth — Percale
Width—Gray—39″ — Finished—36″
Sley—80 — Pick—76
Warp Counts—30^{s} — Filling Counts—34^{s}
Weight of cloth—4 yds. per lb.
Selvage—2 per eye—4 per dent—8 dents.
Weave—Plain weave, woven on 4 harnesses, skip shaft draw.

Percale is a more closely woven fabric than the ordinary print cloth, and is used largely for women's and children's wear, also for handkerchiefs.

SAMPLES 5 AND 5-A

Kind of cloth — Cretonne
Width—Gray—39″ — Finished—37″
Sley—64 — Pick—60
Warp Counts—30^{s} — Filling Counts—38^{s}
Weight of cloth—5.25 yds. per lb.
Selvage—2 per eye—4 per dent—6 dents.
Weave—Plain weave, woven on 2 harnesses.

Cretonne is of print cloth construction, and is printed with large flower effects and other devices. This cloth is used largely for furniture coverings, curtains and draperies.

SAMPLES 6 AND 6-A

Kind of cloth	Imitation Gingham
Width—Gray—27″	Finished—24″
Sley—64	Pick—60
Warp Counts—28^{s}	Filling Counts—40^{s}
Weight of cloth—7.60 yds. per lb.	
Selvage—2 per eye—4 per dent—6 dents.	
Weave—Plain weave, woven on 2 harnesses.	

This sample of imitation gingham is also of print cloth construction. Many different patterns are printed and the cloth is put to a varied number of household uses.

SAMPLES 7 AND 7-A

Kind of cloth	Cambric
Width—Gray—38″	Finished—36.75″
Sley—64	Pick—60
Warp Counts—30^{s}	Filling Counts—40^{s}
Weight of cloth—5.75 yds. per lb.	
Selvage—2 per eye—4 per dent—6 dents.	
Weave—Plain weave, woven on 2 harnesses.	

This is another example of print cloth construction. The gray cloth, however, instead of being printed, is dyed a solid color in the finishing process. The cloth is used largely for linings.

SAMPLES 8 AND 8-A

Kind of cloth	Sheeting
Width—Gray—36″	Finished 34″

Sley—66 Pick—62
Warp Counts—16^{s} Filling Counts—26^{s}
Weight of cloth—3.25 yds. per lb.
Selvage—Ply yarn, 1 per eye—2 per dent—8 dents.
Weave—Plain weave, woven on 2 harnesses.

Sheeting, as the name implies, is a cloth that is very extensively used for sheets. However, cloths that come within the range of sheeting constructions are finished in a great variety of ways and are used extensively in many different fields. Cloths grouped under the heading of sheetings, probably comprise the largest single group of cloths found in cotton textiles. Some of the more prominent uses of these cloths are the following:—Parts of automobile tires, rubberized goods, window shades, sheets, bags, shirts, children's suits, book binding, dress goods, imitation leather, draperies, automobile trade, oil cloth, wall coverings, tennis shoes, linings for clothing, furniture coverings, shoe lining.

Some of the constructions are as follows:—

Width	*Sley*	*Pick*	*Weight*	*Width*	*Sley*	*Pick*	*Weight*
36	44	40	6.15	37	48	48	4.
40	44	40	4.25	40	48	48	2.50
40	44	44	5.	40	48	48	2.85
36	48	40	5.50	36	48	52	4.70
36	48	44	3.25	36	56	60	4.
40	48	44	3.75	40	60	56	3.60
36	48	48	5.				

SAMPLES 9 AND 9-A

Kind of cloth Sheeting
Width—Gray—40″ Finished—36″
Sley—48 Pick—48
Warp Counts—14^{s} Filling Counts—16^{s}
Weight of cloth—2.85 yds. per lb.

Selvage—2 per eye—4 per dent—6 dents.
Weave—Plain weave, woven on 2 harnesses.

In order to show a second example of the many sheeting constructions, also a different finish, this sample has been included.

SAMPLES 10 AND 10-A

Kind of cloth — India Linon
Width—Gray—30″ — Finished—30″
Sley—68 — Pick—68
Warp Counts—65^s — Filling Counts—90^s
Weight of cloth—14.35 yds. per lb.
Selvage—2 per eye—4 per dent—6 dents.
Weave—Plain weave, woven on 2 harnesses.

India Linon falls within the finer group of cotton fabrics and is made from combed yarns. In the finishing process it is given an appearance resembling linen. This cloth is used extensively for women's and children's wear. Constructions commonly met with are as follows:—

Width	*Sley*	*Pick*	*Weight*
30	72	60	12.
30	80	80	11.75
30	88	80	11.25
30	96	100	10.25

SAMPLES 11 AND 11-A

Kind of cloth — Muslin
Width—Gray—39″ — Finished—35.5″
Sley—68 — Pick—72
Warp Counts—28^s — Filling Counts—38^s
Weight of cloth—4.75 yds. per lb.
Selvage—2 per eye—4 per dent—5 dents.
Weave—Plain weave, woven on 2 harnesses.

The term muslin covers rather a wide range of fabrics, and is used for a variety of purposes, such as underwear, aprons, linings, and is also used for sheets and pillow casings. The following constructions are prominent:—

Width	*Sley*	*Pick*	*Weight*
38.5	60	48	6.25
38.5	64	60	5.35
39	72	76	4.25
39	80	80	4.

SAMPLES 12 AND 12-A

Kind of cloth — Long Cloth
Width—Gray—39″ — Finished—36″
Sley—80 — Pick—76
Warp Counts—28^{s} — Filling Counts—40^{s}
Weight of cloth—4.15 yds. per lb.
Selvage—2 per eye—4 per dent—6 dents.
Weave—Plain weave, woven on 4 harnesses, skip shaft draw.

Long cloth is used extensively for women's and children's wear, one of its principal uses being for infants' dresses. The cloth ranges from medium to fine construction, the following being prominent:—

Width	*Sley*	*Pick*	*Weight*	*Width*	*Sley*	*Pick*	*Weight*
39	68	72	4.75	39	80	88	5.
40	72	68	6.	39	96	92	5.25
40	80	76	6.	39	96	100	5.

SAMPLES 13 AND 13-A

Kind of cloth — Lawn
Width—Gray—40″ — Finished—40″
Sley—76 — Pick—72
Warp Counts—60^{s} — Filling Counts—80^{s}

Weight of cloth—9 yds. per lb.
Selvage—Ply yarn—1 per eye—2 per dent—10 dents.
Weave—Plain weave, woven on 2 harnesses.

Lawn cloth comes within the finer grade of cotton fabrics. It is used for women's and children's wear in both the bleached and printed state.

The following constructions are commonly met with:—

Width	*Sley*	*Pick*	*Weight*	*Width*	*Sley*	*Pick*	*Weight*
40	72	68	9.50	40	88	80	8.50
40	76	72	9.	40	96	92	7.50
40	80	80	9.	40	96	100	7.

SAMPLES 14 AND 14-A

Kind of cloth — Voile
Width—Gray—40″ — Finished—37.5″
Sley—60 — Pick—56
Warp Counts—50^{s} — Filling Counts—50^{s}
Weight of cloth—8.22 yds. per lb.
Selvage—2 per eye—4 per dent—12 dents.
Weave—Plain weave, woven on 2 harnesses.

Voiles are used very largely as dress fabrics. They are dyed in solid colors and are also printed. The distinguishing feature of these cloths is the extra amount of twist that is put in both the warp and filling yarns from which the cloth is made.

Ordinarily, the number of turns per inch of twist to be placed in a warp yarn is determined by multiplying the square root of the number indicating the count of the yarn, by 4.75, while the number of turns per inch of twist to be placed in a filling yarn is determined by multiplying the square root of the count by 3.25. With yarns for voiles, however, the number used with which to multiply the

square root of the counts, when determining the twist, ranges generally between 6.50 and 7.50, and this applies not only to the warp yarns, but also to the filling yarns. Owing to the large amount of twist in the filling, this yarn has to be steamed before weaving, in order to set the twist and thus prevent kinking of the filling during the weaving process.

SAMPLES 15 AND 15-A

Kind of cloth — Splash Voile
Width—Gray—36″ — Finished—33.5″
Sley— { Approximately 53 average, 80 sley reed, — Pick—56
Warp Counts—60^s
Filling Counts—56^s splashed
Weight of cloth—9 yds. per lb.
Selvage—Ply yarn—1 per eye—2 per dent —22 dents.
Weave—Plain weave, woven on 2 harnesses.

This sample is an illustration of one type of voile that differs from the regular construction. The warp stripe effect in this cloth is obtained by drawing the warp ends through the reed in an irregular manner. With an 80 sley reed, drawing two ends to a dent, there would be 80 ends per inch in the cloth. The ends in this cloth, however, instead of being drawn two per dent throughout the cloth, are drawn as follows:—2 ends, 1 dent; 2 ends, 1 dent; 2 ends, 1 dent; 1 end, 1 dent; empty dent; 1 end, 1 dent, which completes a repeat. Thus, in one repeat of the reed draft there are 6 dents and 8 ends. If the ends were drawn 2 per dent throughout, then these 6 dents would call for 12 ends and since there are only 8 ends, then the actual number of ends per inch in the cloth will be $\frac{8}{12}$, or 2/3, of 80, or 53 1/3.

The filling yarn used in this cloth is what is termed a splash yarn, also sometimes called ratiné yarn. It consists of the regular filling yarn, increased in weight and size at certain intervals by the addition of an extra amount of roving. This extra amount of roving may be introduced either on the spinning frame, or the roving frame, but in either case calls for special attachments.

SAMPLES 16 AND 16-A

Kind of cloth — Pongee
Width—Gray—34″ — Finished—30.5″
Sley—72 — Pick—100
Warp Counts—50^{s} — Filling Counts—56^{s}
Weight of cloth—7 yds. per lb.
Selvage—Ply yarn—1 per eye—2 per dent —6 dents.
Weave—Plain weave, woven on 4 harnesses, skip shaft draw.

Pongee is used largely for women's and children's wear. It derives its name from the silk fabric of the same name, which it resembles, and the effect produced in the finished fabric results largely from the soft twist in the filling, and the high pick as compared with the sley.

The construction given for sample 16 is one very commonly met with.

SAMPLES 17 AND 17-A

Kind of cloth — Chambray
Width—Gray—32″ — Finished—32″
Sley—68 — Pick—52
Warp Counts—30^{s} — Filling Counts—36^{s}
Weight of cloth—6.40 yds. per lb.

Selvage—Ply yarn—1 per eye—2 per dent
—8 dents.
Weave—Plain weave, woven on 2 harnesses.

The lighter chambrays are used for women's and children's wear, while those of heavier construction are used largely for overalls and such wear. Colored warps, light filling and white selvages are distinguishing features of these cloths.

SAMPLE 18

Kind of cloth Chambray
Width—Gray—36″ Finished—36″
Sley—48 Pick—40
Warp Counts—12^s Filling Counts—14^s
Weight of cloth—3.25 yds. per lb.
Selvage—2 per eye—4 per dent— 6 dents.
Weave—Plain weave, woven on 2 harnesses.

SAMPLES 19 AND 19-A

Kind of cloth Window Holland
also termed Shade cloth
Width—Gray—40″ Finished—37″
Sley—64 Pick—60
Warp Counts—28^s Filling Counts—40^s
Weight of cloth—5 yds. per lb.
Selvage—2 per eye—4 per dent—6 dents.
Weave—Plain weave, woven on 2 harnesses.

The cloth is of standard print cloth construction and care should be taken in the weaving to prevent thick and thin places. The cloth is finished to give the qualities desired in window shades, the principal use of this cloth.

SAMPLES 20 AND 20-A

Kind of cloth — Window Holland
Width—Gray—40″ — Finished—37″
Sley—60 — Pick—56
Warp Counts—28^{s} — Filling Counts—40^{s}
Weight of cloth—5.50 yds. per lb.
Selvage—2 per eye—4 per dent—6 dents.
Weave—Plain weave, woven on 2 harnesses.

SAMPLES 21 AND 21-A

Kind of cloth — Gingham
Width—Gray—32″ — Finished—32″
Sley—68 — Pick—56
Warp Counts—28^{s} — Filling Counts—32^{s}
Weight of cloth—5.75 yds. per lb.
Selvage—White—2 per eye—4 per dent—8 dents.
Weave—Plain weave, woven on 2 harnesses.
Warp pattern—34 ends white—34 ends green.
Filling pattern—28 picks white—28 picks green.

Ginghams are used for women's and children's wear. They are made in a large variety of patterns and require a loom capable of inserting more than one color of filling. A beamer's plan is also required for each pattern, showing the arrangement of the different colored ends. The sample shown here is a simple two color pattern and the beamer's plan would call for 34 ends white, 34 ends green. Many of the patterns however, call for much more elaborate arrangement of both ends and colors.

Note that the sley of this sample and the pick are not the same, the sley being 68 and the pick 56. Consequently

to make the stripe of white in the filling the same width as the stripe of white in the warp, the number of picks of white must bear the same relation to the number of ends of white, that the picks per inch bear to the ends per inch. For example, the sley is 68 and the pick 56; then if there are 34 ends of white in the warp stripe, to find the number of picks of white required to give the same width in the filling stripe, the equation would be $68 : 56 : : 34 : x = 28$ picks of white. The same method is followed in checking off any gingham pattern where it is desired to make a filling stripe the same width in the cloth as any particular warp stripe.

SAMPLES 22 AND 22-A

Kind of cloth — Poplin
Width—Gray—37″ — Finished—37″
Sley—96 — Pick—40
Warp Counts—22^s — Filling Counts—22^s
Weight of cloth—3.40 yds. per lb.
Selvage—Ply yarn—1 per eye—2 per dent —8 dents.
Weave—Plain weave, woven on 4 harnesses, skip shaft draw.

Poplin is primarily a dress fabric, the chief characteristic of which is a cord, or rib effect running across the cloth, somewhat after a rep effect, and is the result of the high sley and coarse filling.

The reed for these cloths should be made from broad thin wire and of good depth in order to obtain the best results. In some cases the ends are drawn 3 per dent and a coarser reed used, but the cloth has a much better appearance if the ends are drawn 2 per dent. Strict attention should be given to the sizing of the warp yarn, since the high sley causes considerable chafing in the loom and the weaver is certain to have trouble with a warp that is

not properly sized. Scratch overs will cause defective cloth and the weaver should find the pick in cases of broken filling, or the filling running out.

SAMPLES 23 AND 23-A

Kind of cloth Cotton Flannel, also termed Flannelette
Width—Gray—40.5″ Finished—38″
Sley—42 Pick—42
Warp Counts—23^s Filling Counts—9^s
Weight of cloth—3 yds. per lb.
Selvage—2 per eye—4 per dent—6 dents.
Weave—Plain weave, woven on 2 harnesses.

Cotton flannel is made in a large variety of patterns, calling for both white and colored yarns. The chief characteristic of this cloth is the nap, which is obtained by passing the cloth through a napping machine one or more times.

The cloth is used in many different garments of men's, women's and children's wear, and is also used largely for coverings.

SAMPLES 24 AND 24-A

Kind of cloth Duck, also termed Canvas
Width—Gray—37″ Finished—34″
Sley—70 Pick—50
Warp Counts—3 ply 30^s
Filling Counts—3 ply 30^s
Weight of cloth—10 oz.
Selvage—1 per eye—3 per dent—3 dents.

Weave:—The weave of this cloth is a plain weave, using a skip shaft draw. In place of 4 harnesses, however, which are customary when weaving plain cloth with a skip shaft draw, special harness frames are employed. These frames have their sides, also top and bottom pieces, made much heavier and thicker than the ordinary frame. Each frame carries two rows of heddles, and although worked by a single treadle, yet serves as a double harness. Thus, while only two harness frames are used, yet, owing to there being a double row of heddles on each frame, it is possible to draw in the ends by the skip shaft method.

Cotton duck is a plain woven fabric of heavy construction. The warp and filling are usually ply yarns, although in some cases the warp yarn may be single and drawn two ends per eye. This cloth is made in a large number of different constructions, and used for many different purposes. It is used extensively for sails, tents, awnings, jumpers, overalls, shoes, hunting coats and many articles of men's, women's and children's wear.

The weight of cotton duck is not designated as being so many yards to the pound, as is the case with lighter cotton cloth, but is spoken of as being such an ounce duck. Thus, the sample shown here is a 10 oz. duck, which indicates that one square yard of the fabric weighs 10 oz.

For numbering heavy sail duck, cloth weighing 18 oz. per running yard, 22″ wide, is taken as a standard and called No. 1. For each ounce below 18 the number is increased by 1, thus No. 2 duck weighs 17 oz. per yd., 22″ wide; No. 3 duck, 16 oz., etc. Duck heavier than 18 oz. per yd. is numbered by ciphers, a cipher being added for each ounce increase in weight. Thus 1/0 duck weighs 19 oz. per yard, 22″ wide. 2/0 duck weighs 20 oz. per yard, 22″ wide, etc. Duck is made as heavy as 20/0 which should weigh 38 oz. per yd. The width of 22″ is the standard for numbered duck and the weight per running yard for other widths is in exact proportion to the width.

Thus 24″ duck would weigh 1/11 more than the standard 22″ goods, while 11″ duck would weigh, per running yard, one half as much as the standard 22″ goods. For example: —No. 8 duck, which weighs 11 oz. per yard, 22″ wide, would weigh 12 oz. per yd. 24″ wide. Again 2/0 duck which weighs 20 oz. per yd., 22″ wide, would weigh 10 oz. per yd., 11″ wide.

SAMPLES 25 AND 25-A

Kind of cloth — Oxford
Width—Gray—38″ — Finished—34″
Sley—88 — Pick—50
Warp Counts—36^s — Filling Counts—13^s
Weight of cloth—3.60 yds. per lb.
Selvage—2 per eye—4 per dent—12 dents.
Weave—Plain weave, woven on 2 harnesses, with the warp ends drawn 2 ends per eye, and these 2 ends drawn through 1 dent in the reed.

Oxfords are used largely in men's, women's and children's wear. The better grades are made from combed yarns, both warp and filling. They are high pick goods and the ends are drawn 2 per eye in the harnesses. Coarse filling is used, ranging from 10^s to 16^s. The weave is a particular one and in all cases where the loom is stopped by the filling running out or breaking, the weaver should find the pick and see that only continuous picks are allowed to remain in the cloth. Scratch overs and ends out should not be allowed.

When weaving these goods it is very essential to have no play in the crank arms of the loom. The reed must be fastened securely, and the belt sufficiently tight to cause the loom, when being started, to drive the first pick firmly against the fell of the cloth. If these points are not

attended to, then marks across the cloth, similar to thin places, will result each time the weaver starts the loom.

SAMPLE 26

Kind of cloth — Osnaburg
Width—Gray—54″
Sley—36 — Pick—30
Warp Counts—7^{s} — Filling Counts—8^{s}
Weight of cloth—1.60 yds. per lb.
Selvage—2 per eye—4 per dent—4 dents.
Weave—Plain weave, woven on 2 harnesses.

Osnaburg is used for many purposes where a coarse, strong, serviceable and less expensive cloth is desired.

SAMPLES 27 AND 27-A

Kind of cloth — Umbrella Cloth
Width—Gray—26″ — Finished—23″
Sley—68 — Pick—82
Warp Counts—40^{s} — Filling Counts—28^{s}
Weight of cloth—6.25 yds. per lb.
Selvage—All ply yarn. First 4 outside ends work plain and drawn 1 per eye, 2 per dent. Next come 84 ends, controlled by a tape selvage motion and drawn 1 per eye, 4 per dent. These ends work as follows: over 3 picks, under 3 picks, no two ends working together.
Weave—Plain weave, woven on 2 harnesses.

Umbrella cloth, as the name implies, is used in the manufacture of umbrellas. The selvage is an important part of these cloths. As stated, the selvage on the particular piece of goods used as a sample, has the 4 outside ends weaving plain and the balance of the selvage ends

weaving over 3 picks, under 3 picks. A more common selvage has all the selvage ends weaving over 2 picks, under 2 picks, the ends drawn 1 per eye, if ply yarn, or 2 per eye, if single yarn. The selvage in this case, is also controlled by a tape selvage motion, and in both cases the selvage ends that are controlled by the tape selvage motion must not come from the beam containing the yarn for the body of the cloth, owing to the difference in the take up, or contraction, of the two yarns during weaving.

SAMPLES 28 AND 28-A

Kind of cloth — Three Leaf Twill
Width—Gray—40″ — Finished—40″
Sley—64 — Pick—96
Warp Counts—36^s — Filling Counts—30^s
Weight of cloth—4.30 yds. per lb.
Selvage—3 per eye—6 per dent—6 dents.
Woven with a tape selvage motion, the ends working over 2 picks, under 2, and the picks working over 3 ends, under 3.
Weave—3 harness, filling flush twill, twill runs to the right.

Fig. 12

Fig. 13

Fig. 12 shows the weave of this cloth, the figure giving two repeats in the ends and two repeats in the picks. Fig. 13 shows two repeats of the harness, or drawing-in draft. The warp ends are drawn 2 per dent in the reed. These cloths are woven on cam looms, the cams being constructed to lower and lift the harnesses in the right order.

Cloths with twill weaves have a wide range of con-

struction, some of the many constructions in the group to which this sample belongs being as follows:—

Width	*Sley*	*Pick*	*Weight*	*Width*	*Sley*	*Pick*	*Weight*
31	64	70	4.20	43	64	96	4.
31	68	76	3.85	43	64	96	4.30
39	64	72	4.80	43	64	104	3.85
39	68	76	4.	43	72	120	3.35

Twill weaves are spoken of as being warp flush, or filling flush, the term having reference to the yarn that predominates on the face of the cloth. If there is the same amount of warp and filling on the face, then it is termed equal flush. The weave of sample 28 is a filling flush weave since it brings more filling than warp to the face of the goods, each warp end being up for one pick and down for two picks, in one repeat of the weave. This cloth is used largely for linings.

SAMPLES 29 AND 29-A

Kind of cloth — Drill
Width—Gray—29.5″ — Finished—28″
Sley—72 — Pick—48
Warp Counts—12^{s} — Filling Counts—18^{s}
Weight of cloth—3 yds. per lb.
Selvage—2 per eye—4 per dent—3 dents, same weave as body of cloth.
Weave—3 harness, warp flush twill, twill runs to the left.

Fig. 14

Fig. 15

Fig. 14 shows the weave of this cloth, the figure giving two repeats in the ends and two repeats in the picks. Fig. 15 shows two repeats of the harness, or drawing-in

draft. The warp ends are drawn 3 per dent in the reed. This cloth is woven on a cam loom.

Note that the weave is a warp flush weave, since it brings more warp than filling to the face of the cloth.

Cloths similar to the sample are used largely in the shoe trade, other constructions are as follows:—

Width	*Sley*	*Pick*	*Weight*	*Width*	*Sley*	*Pick*	*Weight*
30	68	48	2.50	37	68	40	2.35
30	70	48	2.85	37	68	36	3.
30	66	44	3.	37	68	40	3.25
30	68	40	3.25	37	68	40	3.50
30	70	48	4.	37	66	36	3.95

SAMPLE 30

Kind of cloth — Denim
Width—Gray—28″
Sley—60 — Pick—34
Warp Counts—7^s — Filling Counts—12^s
Weight of cloth—2.80 yds. per lb.
Selvage—2 per eye—4 per dent—3 dents, same weave as body of cloth.
Weave—3 harness, warp flush twill, twill runs to the left.

Fig. 16

Fig. 17

Fig. 16 shows the weave of this cloth, the figure giving two repeats in the ends and two repeats in the picks. Fig. 17 shows two repeats of the harness, or drawing-in draft. The warp ends are drawn 3 per dent in the reed. The cloth is woven on a cam loom.

The warp in this cloth is yarn dyed and the filling is spun from one bobbin of black and one bobbin of white for back roving. This cloth is used largely in the making of garments for rough wear, such as overalls. Jean is another term used to designate this cloth.

SAMPLES 31 AND 31-A

Kind of cloth — Four Leaf Twill
Width—Gray—43″ — Finished—43″
Sley—64 — Pick—104
Warp Counts—30^s — Filling Counts—36^s
Weight of cloth—3.85 yds. per lb.
Selvage—3 ends per eye—3 ends per dent, 10 dents. Woven with a tape selvage motion, the ends working over 2 picks, under 2, and the picks working over 3 ends, under 3.
Weave—4 harness, filling flush twill, twill runs to the right.

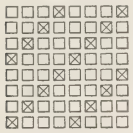


Fig. 18

Fig. 19

Fig. 18 shows the weave of this cloth, the figure giving 2 repeats in the ends and 2 repeats in the picks.

Fig. 19 shows 2 repeats of the harness, or drawing-in draft. The warp ends are drawn 2 per dent in the reed. The cloth is woven on a cam loom.

Other constructions are:—

Width	*Sley*	*Pick*	*Weight*
37.5	64	72	5.25
35	64	80	5.10
38	64	80	4.

SAMPLES 32 AND 32-A

Kind of cloth — Albert Twill
Width—Gray—37″ — Finished—35.5″
Sley—64 — Pick—74
Warp Counts—30^{s} — Filling Counts—28^{s}
Weight of cloth—4.40 yds. per lb.
Selvage—3 ends per eye—3 ends per dent—9 dents. Woven with a tape selvage motion, the ends working over 2 picks, under 2, and the picks working over 3 ends, under 3.
Weave—5 harness filling flush twill, twill runs to the right.

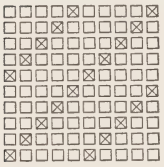


Fig. 20

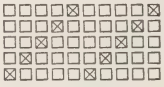


Fig. 21

Fig. 20 shows the weave of this cloth, the figure giving 2 repeats in the ends and 2 in the picks.

Fig. 21 shows 2 repeats of the harness, or drawing-in, draft. The warp ends are drawn 2 per dent in the reed. The cloth is woven on a cam loom.

Other constructions are:—

Width	*Sley*	*Pick*	*Weight*
38	64	80	4.
35	64	80	4.
35	64	80	4.40
35	64	80	5.10
37.5	64	72	5.25
36	64	72	5.40

SAMPLES 33 AND 33-A

Kind of cloth — Warp Sateen
Width—Gray—39″ — Finished—39″
Sley—168 — Pick—88
Warp Counts—60^{s} Filling Counts—100^{s}
Weight of cloth—5.75 yds. per lb.
Selvage—3 ends per eye—6 ends per dent—7 dents. Woven with a tape selvage motion, the ends working over two picks, under two, and the picks working over 3 ends, under 3.
Weave—5 harness, warp flush sateen.

Fig. 22 shows the weave of this cloth, the figure giving 2 repeats in the ends and 2 repeats in the picks.

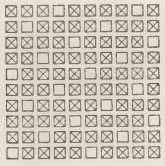


Fig. 22

Fig. 23

Fig. 23 shows 2 repeats of the harness, or drawing-in draft. The warp ends are drawn 3 per dent in the reed. The cloth is woven on a cam loom.

Warp flush weaves are often woven face down, the harnesses being raised and lowered in the reverse order to that shown by the weave on design paper. For example, if it was desired to weave sample face down, then the warp ends would be lowered where they are shown raised in Fig. 22 and they would be raised where they are shown lowered in the figure.

Sateen cloths are used largely for lining garments used in men's, women's and children's wear.

Other constructions of warp sateens are as follows:—

Width	*Sley*	*Pick*	*Weight*	*Width*	*Sley*	*Pick*	*Weight*
54	96	56	1.05	38	110	68	5.
54	96	60	1.55	38	128	68	5.50
34	104	52	3.35	38	140	72	5.70
34	104	56	3.	38	144	88	5.70

In a true warp sateen, only one end in one repeat of the weave, is down on each pick of the weave, also no two adjacent ends are down on succeeding picks, that is, if the 2d end of a warp sateen is down on the 4th pick of the weave, as in Fig. 22, then all the other ends in one repeat must be raised, also the 1st and 3d ends must be raised on the pick preceding, and the pick following the 4th pick, namely the 3d and 5th picks.

Referring to Fig. 22 it will be seen that on the first pick the first end is lowered, on the 2d pick the 3d end is lowered, on the 3d pick the 5th end is down, on the 4th pick the 2d end, and on the 5th pick the 4th end is down, which completes one repeat of the weave. This order is known as the 1-3-5-2-4 order.

A true sateen cannot be made on less than 5 harnesses, although a 4 harness weave having the order 1-3-2-4 is sometimes spoken of as a sateen. The correct name for this weave is the broken crow, the 4 harness twill being known as the crow twill. Cloths with a sateen weave are without prominent lines, such as are found in twill weaves, and give a particularly soft finish, owing to the face of the cloth having one series of yarn, either the warp or filling, largely predominating.

SAMPLES 34 AND 34-A

Kind of cloth — Filling Sateen
Width—Gray—38.5″ — Finished—36″
Sley—84 — Pick—136

Warp Counts—40[s] Filling Counts—50[s]
Weight of cloth—4.25 yds. per lb.
Selvage—3 ends per eye—6 ends per dent—6 dents. Woven with a tape selvage motion, the ends working over 2 picks, under 2, and the picks working over 3 ends, under 3.
Weave—5 harness, filling flush sateen.

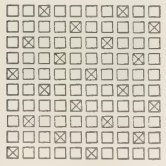


Fig. 24

Fig. 25

Fig. 24 shows the weave of this cloth, the figure giving 2 repeats in the ends and 2 repeats in the picks.

Fig. 25 shows 2 repeats of the harness, or drawing-in draft. The warp ends are drawn 3 per dent in the reed. The cloth is woven on a cam loom.

Other constructions of filling sateens are as follows:—

Width	*Sley*	*Pick*	*Weight*	*Width*	*Sley*	*Pick*	*Weight*
37.5	64	72	5.25	39	64	112	4.
31.5	64	88	5.50	39	72	120	3.50
37.5	64	88	4.70	43	96	132	3.35
37.5	64	104	4.37				

SAMPLES 35 AND 35-A

Kind of cloth Filling Sateen
Width—Gray—35.5″ Finished—35.5″
Sley—72 Pick—68
Warp Counts—24[s] cotton
Filling Counts—150 denier rayon

Weight of cloth—4.45 yds. per lb.
Selvage—Tape selvage, ends drawn 2 per eye—4 per dent—7 dents. Ends work over 2 picks, under 2 picks. Filling works over 2 ends, under 2 ends.
Weave—8 end filling flush sateen.

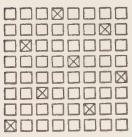


Fig. 26

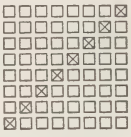


Fig. 27

Fig. 26 shows 1 repeat of the weave of this cloth.

Fig. 27 shows 1 repeat of the harness, or drawing-in draft. The ends are drawn 2 per dent in the reed.

Cloths similar to the sample are used for women's and children's wear, also for linings.

SAMPLES 36 AND 36-A

Kind of cloth	Lingette, also termed Shadow Cloth
Width—Gray—38″	Finished—35.75″
Sley—144	Pick—88
Warp Counts—60^{s}	Filling Counts—70^{s}

Weight of cloth—5.75 yds. per lb.
Selvage—2 ends per eye—4 ends per dent—11 dents. Woven with a tape selvage motion, the ends working over 2 picks, under 2, and the picks working over 2 ends, under 2.
Weave—5 harness, warp flush sateen.

Fig. 28 shows the weave of this cloth, the figure giving 2 repeats in the ends and 2 repeats in the picks.

Fig. 29 shows 2 repeats of the harness, or drawing-in, draft. The warp ends are drawn 3 per dent in the reed. The cloth is woven on a cam loom.

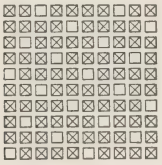


Fig. 28

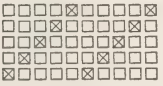


Fig. 29

Note that the weave of this sample has a different order of working than the weave for Sample 33 which also is a 5 harness warp sateen weave. Either order is used in these cloths.

The stripe effect in the finished cloth is produced by using in the warp both regular and reverse twist yarn. Thus in sample 36 the warp yarn is arranged 12 ends regular twist, 12 ends reverse twist. When the cloth is finished, stripes will show, equal in width to the 12 ends.

The colored ends in the gray sample are those having the reverse twist and this color is applied in order that the weaver, and others handling the yarn, may readily distinguish one yarn from the other. This color is applied at the slasher and is of such a nature that it is readily removed in the finishing process.

In some cases the reverse twist yarn is run as a top beam and slashed separately. In other cases the two yarns are slashed together and placed on the same loom beam. In the latter case the slasher must be provided with two size boxes, since the coloring material is put in the size.

This cloth is used largely for linings and women's and children's wear.

SAMPLES 37 AND 37-A

Kind of cloth	Crepe
Width—Gray—37″	Finished—34″
Sley—36	Pick—48
Warp Counts—20^{s}	Filling Counts—150 denier rayon
Weight of cloth—7.50 yds. per lb.	
Selvage—2 per eye—4 per dent—6 dents.	
Weave—Plain weave, woven on 2 harnesses.	

Crepes are used largely in kimonas, shirtings, and dress goods. The crepe effect is produced by using hard twisted yarns of both the right and left twist. The sample given here has the warp arranged 2 ends right twist, 2 ends left twist, both the right and left twist yarn being hard twisted. The filling is regular rayon yarn of 150 denier.

Crepes may be made with regular twist in the warp yarn and the filling containing the hard twisted yarn and being arranged 2 right, 2 left. This weave would require a box loom. Again both the warp and filling may be hard twisted, and one series, either the warp or filling, arranged 2 right, 2 left; or again both warp and filling may be hard twisted and both arranged 2 right, 2 left.

As in the case of lingette, where yarns of right and left twist are used in the warp, the yarn with the reverse twist is colored when slashed, in order that it may be readily distinguished from the yarn with the regular twist.

SAMPLES 38 AND 38-A

Kind of cloth	Embossed Crepe
Width—Gray—38″	Finished—36″
Sley—44	Pick—40
Warp Counts—28^{s}	Filling Counts—40^{s}

Weight of cloth—8.20 yds. per lb.
Selvage—2 ends per eye—4 ends per dent—
6 dents.
Weave—Plain weave, woven on 2 harnesses.

This sample is introduced here to illustrate what may be done, with an ordinary cheese cloth, in the finishing process. The crepe effect is lost if the cloth is dampened.

The cloth is dyed many different colors, is also to be obtained in fancy and Jacquard effects.

It is exported to Southern countries.

SAMPLES 39 AND 39-A

Kind of cloth — Broadcloth
Width—Gray—38″ — Finished—35″
Sley—124 — Pick—64
Warp Counts—35^s
Filling Counts 40^s
Weight of cloth—4 yds. per lb.
Selvage—8 ends—2 ply yarn, drawn 1 per eye—2 per dent— 4 dents.
Weave—Plain weave, woven on 4 harnesses, skip shaft draw. Ends drawn 3 per dent in the reed.

Broadcloths are used in a wide range of fabrics for men's, women's and children's wear. They are finished white and in colors. They are also printed. Many different forms of broadcloth are woven. In some cases the fabric is made from single yarns, both warp and filling. In other cases 2 ply warp is used with single filling. The best constructed cloth, however, has 2 ply yarn for both warp and filling.

SAMPLES 40 AND 40-A

Kind of cloth — Broadcloth
Width—Gray—37″ — Finished—35″
Sley—124 — Pick—68
Warp Counts—2 ply 80^{s} — Filling Counts—2 ply 110s
Weight of cloth—4.50 yds. per lb.
Selvage—2 per eye—4 per dent—5 dents.
Weave—Plain weave, woven on 4 harnesses, skip shaft draw. Ends drawn 2 per dent in the reed.

This is a sample of the better grade of broadcloth found on the market. The yarns are made from Egyptian cotton, and being 2 ply, both warp and filling, the cloth is of high quality and very popular.

SAMPLES 41 AND 41-A

Kind of cloth — Alpaca
Width—Gray—34″ — Finished—34″
Sley—64 — Pick—46
Warp Counts—42^{s} — Filling Counts—150 denier rayon
Weight of cloth—8 yds. per lb.
Selvage—2 per eye—4 per dent—7 dents.
Weave—Plain weave, woven on 2 harnesses. Best results are obtained with this cloth by drawing the ends 1 per dent in the reed, although they are woven, in some cases, 2 per dent.

SAMPLES 42 AND 42-A

Kind of cloth — Warp Rep
Width—Gray—38″ — Finished—36″

Sley—105 Pick—44
Warp Counts—30^s Filling Counts—22^s
Weight of cloth—3.30 yds. per lb.
Selvage—2 ends per eye—4 ends per dent—6 dents. Selvage ends from bottom beam.
Weave—Woven on 2 harnesses, harnesses working in plain order.

There are certain peculiarities of a warp rep weave that require further explanations. The warp yarn is placed on 2 beams, a bottom beam and a top beam. The yarn from the bottom beam is drawn through the front harness and drawn 1 per eye. This beam has considerable friction placed upon it in order that these ends will weave tightly.

The yarn from the top beam is drawn through the back harness and drawn 2 per eye. This beam has very little friction placed upon it and the ends allowed to weave slack. There is very little contraction in the yarn from the bottom beam during weaving, while the contraction in the yarn from the top beam will be about 25%.

The ends are drawn 3 per dent in the reed, one end from the bottom beam, and 2 from the top beam. One pick beats up the top warp on the face of the cloth, while the next pick beats up the top warp on the back of the cloth. This results in rib, or cord, effects running width-way of the cloth, an effect always prominent in warp reps. The weave is a particular one, as many things that may be allowed to pass in other cloths will cause warp reps to be classed as second quality. The pick has to be matched, when the filling runs out, otherwise there will be a mark across the cloth. An end out will also give a bad appearance to the cloth.

Warp reps are finished white, also dyed in solid colors. The cloth is used for men's, women's and children's wear.

SAMPLES 43 AND 43-A

Kind of cloth — Himalaya Cloth
Width—Gray—38″ — Finished—34.25″
Sley—72 — Pick—36
Warp Counts—18^{s} — Filling Counts—28^{s}
Weight of cloth—3.70 yds. per lb.
Selvage—2 per eye—4 per dent—8 dents.
Weave—Plain weave, woven on 4 harnesses, skip shaft draw. Ends drawn 2 per dent in the reed.

The distinguishing feature of Himalaya cloth is the coarser filling that appears in the cloth at irregular intervals, there being no fixed repeat to the manner in which this coarser filling is inserted. For example, if a 2 x 1 box loom was used and the heavy and light filling inserted by means of two shuttles, then it would be necessary to have a certain number of picks of light filling, then a given number of heavy filling, and it would also be necessary to have the arrangement repeat at a certain point. In a Himalaya cloth, however, the reverse is true and the heavier filling begins and leaves off at some portion of the pick between the two selvages, instead of at the selvages. This result is obtained by having the heavy and light portions one continuous piece of filling, and not two separate fillings. The yarn may be spun on a filling frame and is produced by means of special mechanism that causes an extra end of roving to be fed to the back rolls intermittently, thus causing the heavier yarn. The regular roving is not fed through the back rolls, but is carried directly to the middle set of rolls and all the draft is inserted between the front and middle rolls.

In other cases special mechanism is applied to the final roving frame that will speed up the back and middle sets of rolls at varying intervals, thus causing the finished roving to be heavier in some places than in others. This

roving may be fed to the spinning frame as single roving or may be run with one end of regular roving.

Himalaya cloth is used for men's, women's and children's wear.

SAMPLES 44 AND 44-A

Kind of cloth — Dimity
Width—Gray—36.5″ — Finished—34″
Sley—116 — Pick—76
Warp Counts—56^s — Filling Counts—100^s
Weight of cloth—7.50 yds. per lb.
Selvage—Ply yarn—1 per eye—2 per dent —8 dents.
Weave—This cloth is woven with 2 harnesses, the harnesses working in plain order. The ends are drawn through the harnesses as follows: 3 ends, 1 per eye; 3 ends, 3 per eye, then repeat. In the reed the ends that are drawn 1 per eye are drawn 2 of the ends in 1 dent, the other end drawn in the dent with the 3 ends that are in 1 eye.

The best cloth will result if the ends that are drawn 3 per eye are placed on a separate beam.

The cord effect running warp way in these cloths is the result of having 2 or more ends drawn through the same eye of the harness, and thus working together. In other cases, ply yarn is used to give the same effect.

Dimities may be printed, as in the case of the sample; they may be dyed, woven with colored yarn, or finished white. They are used for women's and children's wear, also for household purposes, such as curtains.

SAMPLES 45 AND 45-A

Kind of cloth — Bedford Cord
Width—Gray—35.5″ — Finished—35.5″
Sley—148 — Pick—112
Warp Counts—40^{s} & 30^{s} Filling Counts—50^{s}
Weight of cloth—3.40 yds. per lb.
Selvage—Ply yarn—1 per eye—2 per dent —8 dents.
Weave—Bedford Cord weave.

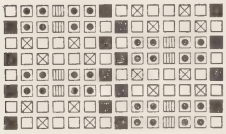


Fig. 30

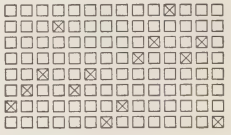


Fig. 31

Fig. 32

Fig. 33

Fig. 30 shows the weave of this cloth, the figure giving 2 repeats in the picks, and 1 repeat in the ends.

Fig. 31 shows the harness, or drawing-in draft. This cloth calls for a dobby.

Fig. 32 shows the reed draft for Fig. 31, that is, this figure indicates the manner in which the ends are grouped when drawn through the dents of the reed.

Fig. 33 shows the chain draft.

The ridges, or cords, running warp way in these cloths, give the distinguishing feature. They are produced by the weave and the best effects are obtained when ends, known as wadding, or stuffer ends, are used, as in the case of the sample.

In one repeat of a Bedford Cord weave there are two sets of plain ends, each set consisting of two ends. These

ends work plain throughout the entire weave and form the furrows, or depressions, between the ridges.

In Fig. 30 these plain ends are shown by ■.

Between the two sets of plain ends are what are termed the face ends and the wadding ends, if any. The number of these ends will vary according to the width of ridge desired.

In Fig. 30 there are 5 ends between the plain ends, 4 of these are face ends, being shown in the figure by ⊠ and ▣, while the other end is the wadding end and is shown by ▥.

Note that when the face ends in one section are working plain, the face ends in the other section are raised. This continues for 2 picks and then the order changes, the face ends that have been raised, commence to work plain, while the face ends in the other section are raised. The wadding end is raised when the two face ends on each side of the wadding end are raised. This prevents the wadding end from showing on the face of the cloth, but at the same time allows the 2 picks of filling to pass under the wadding end and thus hold it in position.

An important point to note in connection with these weaves, is to separate the 2 ends that work plain, when drawing them through the reed. Referring to Figs. 31 and 32 it will be noted that the first end, which is a plain end is drawn through a dent with the second end, which is a face end. Also the seventh and eighth ends, which are plain are not drawn through the same dent, but each of these ends is drawn through a dent with a face end.

This weave requires at least 2 beams, one for the plain and face ends, and one for the wadding. In some cases the ends working plain throughout the cloth are put on a separate beam.

It is not possible to pick out these cloths in the same manner as is done when dissecting most weaves, but by having a good general knowledge of their construction, it is possible to learn the weave of any sample by studying it with the pick glass, determining the number of face ends between depressions and the number of wadding

ends, then putting these ends on design paper, after the manner shown in Fig. 30. When making the drawing-in draft it is customary to put the ends that work plain throughout the cloth, on the front harnesses, the wadding ends on the back harnesses, and the face ends on the harnesses between. Each wadding end should be drawn into a dent with 2 or more face ends.

Bedford Cords fabrics are used in women's and children's wear.

SAMPLES 46 AND 46-A

Kind of cloth — Pique
Width—Gray—36″ — Finished—34″
Sley—72 — Pick—94
Warp Counts—29^s & 2 ply 29^s
Filling Counts—15^s
Weight of cloth—2.40 yds. per lb.
Selvage—Tape selvage—3 per eye—3 per dent. Ends weave as follows, over 2 picks, under 2 picks.
Weave—Pique weave.

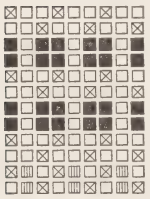


Fig. 34

Fig. 35

Fig. 36

Fig. 37

Fig. 34 shows the weave of this cloth, the figure giving 3 repeats in the ends and 1 in the picks.

Fig. 35 shows the harness, or drawing-in draft.

Fig. 36 shows the reed draft for Fig. 35.

Fig. 37 shows the chain draft.

A Pique cloth resembles a Bedford Cord in that the weave produces cord effects in the cloth. In the case of piques, however, these cord effects run across the cloth, or from selvage to selvage, while in Bedford Cords they run with the warp.

Referring to Fig. 34, ends 1, 3, 4, 6, 7 and 9 are known as face ends. Ends 2, 5 and 8 are known as back ends. On the first and second picks of the weave, the back ends are raised, causing the depression between the cords. These back ends come from a separate beam and are under considerable tension.

On picks 3, 4, 7, 8, 11 and 12 all face ends weave plain. On picks 5, 6, 9 and 10 all face ends are raised allowing wadding picks to be inserted. These picks do not show on the face of the cloth but lie between the back ends and the face. Pick 7 will be driven against pick 4, and pick 11 will be driven against pick 7. The take-up pawl is lifted when the wadding picks are inserted, as indicated by the ▥ in the chain draft, Fig. 37. This weave requires a dobby. In some cases heavier yarn is used for the wadding picks, which requires a 2 x 1 box loom. When a 1 x 1 box loom is used, additional wadding picks have to be inserted.

Note that each back end is drawn in a dent with two face ends, one on each side of the wadding end.

A Pique cloth finds much the same use as a Bedford Cord.

SAMPLES 47 AND 47-A

Kind of cloth Pyjama (Pajama) Check
Width—Gray—36″ Finished—36″
Sley—76 Pick—72
Warp Counts—56^s Filling Counts—70^s
Weight of cloth—9 yds. per lb.
Selvage—2 per eye—4 per dent—8 dents.
Weave—3 ends plain, 3 ends in 1 eye

working as a single end, cutting with the end on each side. 3 picks plain, 3 picks in one shed, cutting with the pick on each side of the 3.

The ends are drawn through the reed as follows:—2 single plain ends in 1 dent, 1 single plain end in 1 dent with the 3 ends from 1 eye.

Pajama checks are used for men's, women's and children's wear. They are mostly similar to the sample, having 3 picks plain, then 3 picks in one shed, the pattern repeating on 6 picks. The ends are drawn as in the sample, 3 ends single and then 3 ends in one eye. The cloth can be woven on a cam loom of high speed, as well, if not better, than with a dobby. The cams are made 6 picks to the round, 3 picks in one shed and 3 picks plain. A selvage motion is required under this arrangement.

Medium count yarns are used in many of these cloths and the cloth has the advantage of weaving well.

SAMPLES 48 AND 48-A

Kind of cloth — Mock Leno
Width—Gray—30.5″ — Finished—28.5″
Sley—58 — Pick—76
Warp Counts—29^s — Filling Counts—32^s
Weight of cloth,—5.85 yds. per lb.
Selvage—2 per eye—4 per dent—8 dents.
Weave—Mock Leno checkerboard.

Fig. 38 shows the weave of this cloth.
The weave repeats on 60 ends and 80 picks.
Fig. 39 shows the harness, or drawing-in draft.
Fig. 40 shows the reed draft for Fig. 39.
Fig. 41 shows the chain draft.

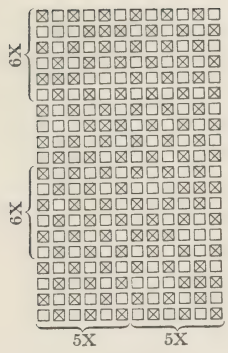


Fig. 38

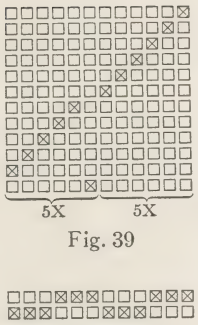


Fig. 39

Fig. 40

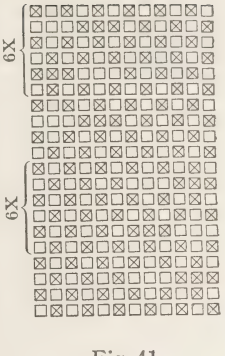


Fig. 41

Note that in Fig. 38, which shows the weave of the sample, also in Fig. 39, which shows the drawing-in draft, the first 6 ends, also the last 6 ends, are bracketed and marked "5x". This indicates that the first 6 ends are to be repeated 5 times before taking the seventh end, also that after repeating the first 6 ends 5 times, the last 6 ends are to be repeated 5 times, thus making the complete weave occupy 60 ends.

In the picks of Fig. 38 certain picks are bracketed and marked "6x", indicating that the picks enclosed in the bracket are repeated 6 times before coming to the next pick shown in the figure. Note that the ends are drawn 3 per dent, 2 ends of plain together with the end between these 2 ends, which does not work plain. This method of drawing the ends in the reed, combined with the weave, causes these ends to run together in the cloth and give a leno effect. When these ends weave in the one manner throughout the length of the cloth, and are not made to weave plain at any time, a dent in the reed is generally skipped between one dent of the mock leno ends and the next dent of mock leno ends. This produces a more open space in the cloth and causes the cloth to more closely resemble a true leno. In the case of the sample, however, the ends weave plain part of the time and then weave the

mock leno and it is not possible to leave empty dents in the reed. This gives the checkerboard effect in the cloth.

SAMPLES 49 AND 49-A

Kind of cloth — Twill Checkerboard
Width—Gray—32.5″ — Finished—30.5″
Sley—48 — Pick—64
Warp Counts—27^s — Filling Counts—20^s
Weight of cloth—4.80 yds. per lb.
Selvage—2 per eye—4 per dent—7 dents, ends weave over 1 pick, under 1. Picks weave over 2 ends, under 2.
Weave—Checkerboard, using a 4 end twill.

Fig. 42 shows the weave of this cloth.

Fig. 43 shows the harness, or drawing-in draft.

Fig. 44 shows the chain draft. The ends are drawn 2 per dent throughout the warp inside the selvages.

Twill checkerboards are made on the twill herringbone system, one block, or square having a regular warp flush twill running in one direction, while the next block, in any direction, has a filling flush twill running in the opposite direction. Thus, if the first block is on 20 ends and 20 picks and is woven with a $\frac{4}{1}$ twill, running to the right, then the block on each side will be woven with a $\frac{1}{4}$ twill, running to the left.

When constructing these weaves, the principal point to be considered is to have the last end of one block, cut with the first end of the next block, also to have the last pick of one block cut with the first pick of the next block. That is, wherever the last end of one block has warp up, the first end of the next block must have filling up and this is true of the last pick of one block and the first pick of the next.

The 2 twills, one with warp on the face and the other

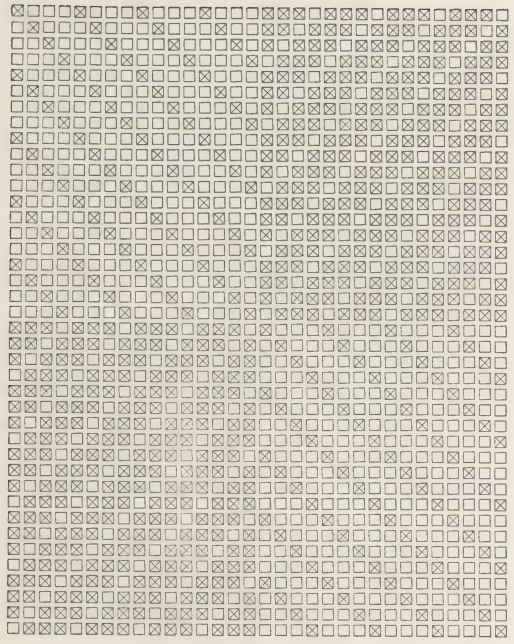


Fig. 42

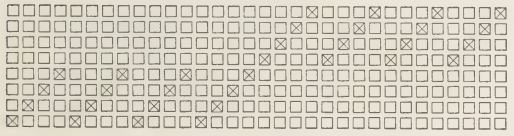


Fig. 43

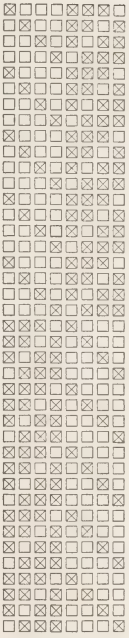


Fig. 44

with filling up, reflect the light differently and thus give the effect desired.

Cloths with these weaves are used for towels, napkins and for children's wear.

SAMPLES 50 AND 50-A

Kind of cloth	Honeycomb
Width—Gray—23″	Finished—22.5″

Sley—50 Pick—50

Warp Counts—2 ply 20^s

Filling Counts—9^s

Weight of cloth—3 yds. per lb.

Selvage—2 per eye—4 per dent—7 dents, plain weave.

Weave—Honeycomb weave.

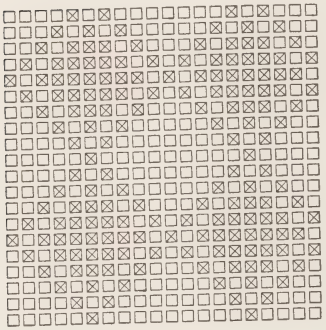


Fig. 45

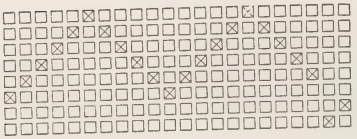


Fig. 46

Fig. 47

Fig. 45 shows the weave for the sample, the figure giving 2 repeats in the ends and 2 in the picks.

Fig. 46 shows the harness, or drawing-in draft. The ends are drawn 2 per dent throughout.

Fig. 47 shows the chain draft.

As there are no ends in the weave that work plain, it is necessary to add 2 harnesses for the selvage and these harnesses are shown in both the harness draft and the chain draft, being harnesses number 1 and 2.

In these cloths the weave causes the threads to interlace in such a manner that blocks, or circles, result, these

blocks or circles having the centers higher than the ridges that form the sides, thus giving the cloth an appearance of hollow places. These depressions and ridges are formed by floating part of the warp and filling threads opposite to each other on the face and back of the cloth.

The principal difficulty in making honeycomb weaves is to so construct them that the center point of the warp float on the face will be the center point of the filling float on the back. Thus, a needle pushed through the center point of the filling float on one side of the cloth, should pierce the center of the warp float on the other side of the cloth.

This cloth is used for towels, principally.

SAMPLES 51 AND 51-A

Kind of cloth	Nainsook Check
Width—Gray—31″	Finished—29.5″
Sley—70 ground	Pick—68 ground
Warp Counts—30^s	Filling Counts—36^s

Weight of cloth—5.50 yds. per lb.
Selvage—2 per eye—4 per dent—6 dents.
Weave—Check weave.

Fig. 48 shows the weave of this cloth.

Fig. 49 shows the harness, or drawing-in draft.

Fig. 50 shows the chain draft.

Harnesses 1 and 2 are for selvage ends only. Ends are drawn 2 per dent from harnesses 3, 4, 5 and 6, and 3 per dent from harnesses 7, 8, 9 and 10.

The crosses shown on the 12th vertical row in the chain draft are for stop pegs put in the harness chain for the purpose of lifting the take-up pawl on the loom, thus allowing more picks per inch to be placed in the cloth at the point where the filling stripe crosses. The exact picks on which the take-up pawl should be lifted cannot be

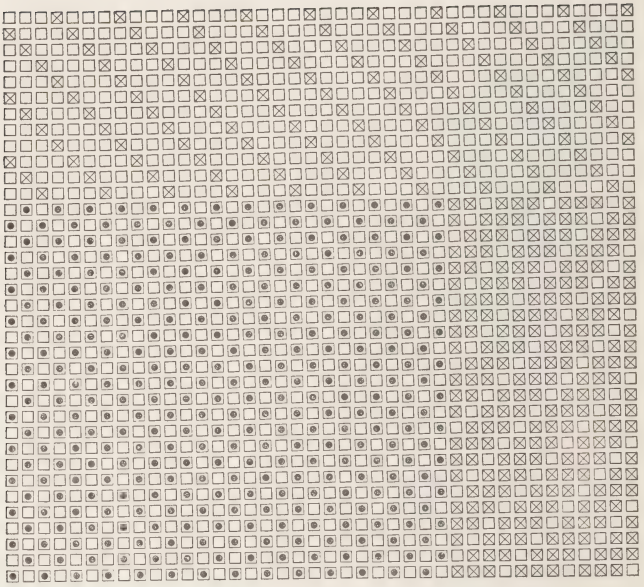


Fig. 48

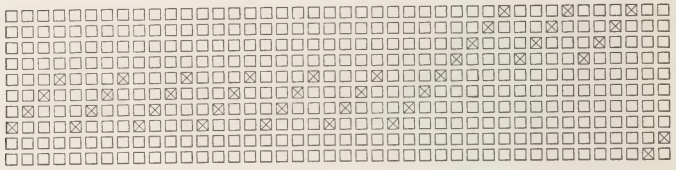


Fig. 49

determined accurately before actually weaving the cloth, as this is something to be experimented with on the loom itself in order to obtain the most satisfactory results.

Nainsook checks are made in a large variety of patterns. The stripes warp way are formed by twills, sateens and broken twill weaves, and the ends in these stripes are drawn 3 per dent, 4 per dent, 5 per dent, or even 6 per dent, according to the extent it is desired to raise the warp stripe and make it heavier than the ground, or plain weave of the cloth.

When weaving the stripe across the cloth, or filling way, there must be more picks per inch in order to have the filling stripe correspond with the warp stripe. This is done by inserting a peg in the harness chain which will lift a jack on the dobby. This jack is connected to the take-up pawl, which is lifted when the jack is raised, thus stopping the take-up motion.

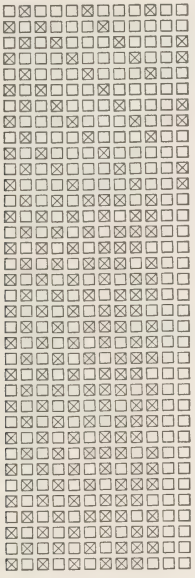


Fig. 50

In constructing these weaves care should be taken to have any two weaves cut where they join, that is a riser, or mark, of one weave should be against a sinker, or blank, of the other weave at the point where the two weaves meet.

Nainsook checks are used for women's and children's wear, also for household purposes.

SAMPLE 52

Kind of cloth — Pillow Tubing
Sley—64 — Pick—66
Warp Counts—28^s — Filling Counts—38^s
Selvage—2 per eye—8 per dent—2 dents.
Selvage ends work same as the ends in the body of the cloth, except that they are double.
Weave—Double plain weave.

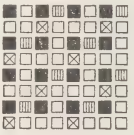


Fig. 51

Fig. 51 shows the weave for the sample, the figure giving 2 repeats in the ends and 2 repeats in the picks. ⊠ shows the face weave, ▥ shows the back weave, and ■ shows the face ends lifted on the back picks.

The drawing-in draft is a straight draw 1-2-3-4, and the ends are drawn 4 per dent, 2 face and 2 back. One repeat of the weave gives the chain draft.

The sample of pillow tubing, sample number 52, is a miniature sample of this kind of cloth. It is evident that it would be impractical to show a full size sample, which would require the full width in order to include the selvages.

Referring to Fig. 51, which shows the weave of this sample; as stated, the face weave of the cloth is indicated by ⊠, the back weave by ▥ and the lifting of the face ends when the back picks are inserted is shown by ■.

Ends 1, 3, 5, 7 in Fig. 51 are face ends, also picks 1, 3, 5, 7 are face picks. That is, these ends and picks produce the top cloth. Consequently when marking the plain

weave on design paper for the top cloth, only these ends and picks are considered and the squares of the design paper are marked 1 up, 1 down, leaving out of consideration the other ends and picks, as though they did not exist. Ends 2, 4, 6, 8 are back ends, also picks 2, 4, 6, 8 are back picks and the plain weave for the back cloth is put on these ends and picks only.

After marking the weave for the face cloth and the weave for the back cloth, it is next necessary to raise all face ends on back picks, since if a face end is down when a back pick is inserted then the two cloths will be stitched together. The same is true if a back end is raised on a face pick.

The actual sley in the reed is double the sley of either the face or back cloth, since both cloths are being woven together and the ends for one are drawn in the same dent with the ends for the other. Thus in sample 52 the sley of the top cloth is 64, which is also the sley of the bottom, but the weave would call for a 64 sley reed, drawing four ends to a dent. A double plain cloth may be woven on a cam loom, and better cloth produced. When using a dobby, mis-picks are more liable to occur, and these result in stitching the two cloths together. With a double index dobby, certain of the top hooks do not engage the knife at any time when producing a double plain weave, and it is of advantage to tie these up in order to avoid their engaging the knife and causing a mis-pick. Also certain of the bottom hooks are engaged with the knife all the time, and for the same reason it is well to fasten them in this position.

The selvage in the sample consists of 2 dents, each dent containing 4 double ends. In the actual cloth there would be at least 8 dents for each selvage and each dent would contain 4 double ends, or preferably 8 ends of 2 ply yarn. Tubing is used for pillow cases, also for bags of many kinds. The cloth can be woven on a narrow loom of high speed, but requires a warp of good yarn and well sized,

since the warp yarn undergoes considerable chafing, there being double the wear there would be to single cloth of the same pick.

SAMPLES 53 AND 53-A

Kind of cloth — Brilliant Spot
Width—Gray—36″ — Finished—36″
Sley—100 — Pick—60
Warp Counts—30^s — Filling Counts—33^s
cotton in the gray, 150 denier rayon in the finished.
Weight of cloth—4.20 yds. per lb.
Selvage—2 per eye—4 per dent—10 dents, plain weave.
Weave—Spot weave.

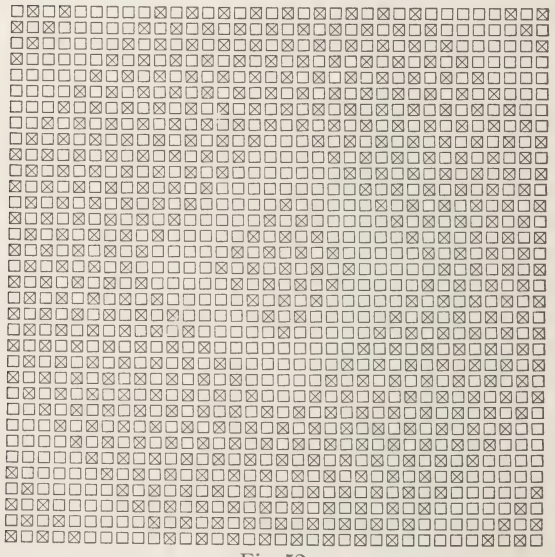


Fig. 52

Fig. 52 shows the weave of this cloth.

Fig. 53 shows the harness, or drawing-in draft.

Harnesses 1 and 2 are for selvage ends only.

The ends are drawn 2 per dent throughout the cloth, inside selvages.

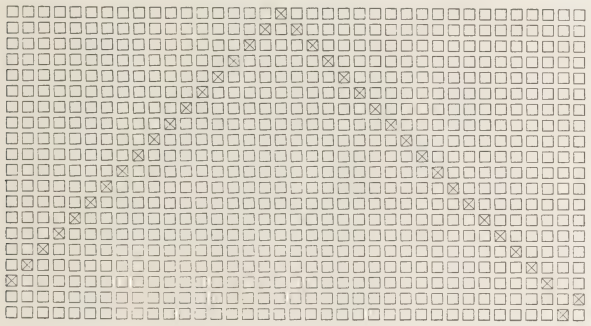


Fig. 53

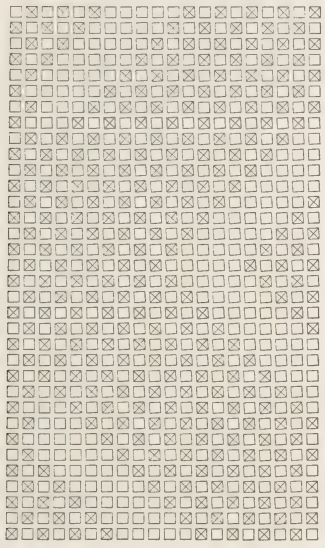


Fig. 54

Fig. 54 shows the chain draft.

Spot weaves are usually made by arranging some conventional figure in a definite order, on a certain number of ends and picks, and filling in the plain weave between the figures. Diamonds similar to the figure in sample 53 are very adaptable to these weaves as they can be made to cut on all sides with the plain weave. The order of arranging the figure is usually either plain, twill or satin. The diamond spot used in the sample is arranged in plain order, consequently requires two spots to complete the weave. Cloths similar to the sample are used for men's, women's and children's wear.

SAMPLES 54 AND 54-A

Kind of cloth — Dotted Muslin
Width—Gray—35″ — Finished—35″
Sley—72 — Pick—62
Warp Counts—60^{s} — Filling Counts—90^{s}
for ground—5^{s} soft twist, for extra filling.
Weight of cloth—9.70 yds. per lb. sheared.
Selvage—2 per eye—4 per dent—8 dents.
Weave—Extra filling spot weave.

Fig. 55 shows the weave of this sample.

Fig. 56 shows the harness, or drawing-in draft.

The ends are drawn 2 per dent throughout the body of the cloth.

Fig. 57 shows the chain draft, made so that the cloth will be woven face down.

Several points of interest are to be noted in connection with the weave shown in Fig. 55. For the purpose of abbreviation some of the ends, also some of the picks, are bracketed, these ends and picks being repeated a number of times.

The entire weave occupies 60 ends and 96 picks, counting the extra filling picks which are used to make the

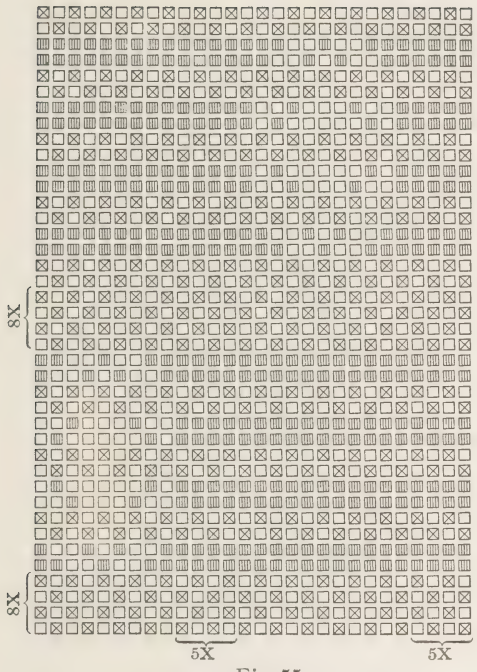


Fig. 55

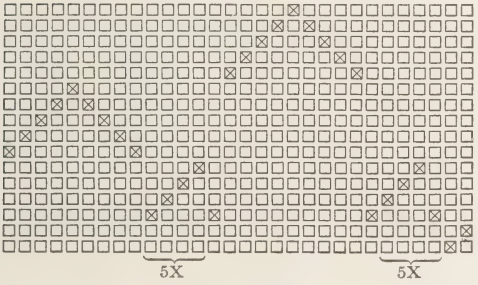


Fig. 56

spots. There are 16 of these extra filling picks in one repeat of the weave. The design as shown in Fig. 55 gives the weave as it appears when looking at the face of the cloth, the ends being marked up as they come up on the face.

Note that when the extra filling picks are put in to form the spots, all the warp ends are raised, with the exception of the few needed to stitch the extra filling to the cloth. This allows the extra filling to remain at the back of the cloth, except where it comes to the face to form the spots. After weaving, this loose filling at the back of the cloth is cut off by means of a shearing machine.

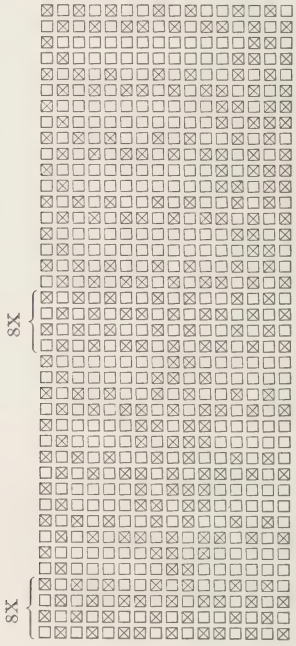


Fig. 57

In order to introduce the extra filling, a box loom is required, since there are two distinct kinds of filling being used. It is also necessary to have some mechanism attached to the loom that will catch the extra filling at the sides of the loom, as the shuttle that contains this filling is thrown from one side of the loom to the other, since it is not desired to have this filling weave into the selvage.

When the extra filling picks are being inserted, stop pegs should be inserted in the harness chain to lift the take-up pawl, since the pick of the goods should not be changed by these picks.

When weaving goods similar to sample 54, it is customary to weave them face down, in order to avoid the heavy strain that otherwise would come upon the loom, owing to the lifting of practically all the warp ends when the extra filling picks are inserted. When making the chain draft, to weave the cloth face down, instead of copying the ends just as they are shown in the weave, the marked squares in the weave are left blank in the chain draft and the blank squares in the weave are marked in the chain draft. Referring to Fig. 57, which shows the chain draft for weave, Fig. 55, it will be noted that this is the method followed in this case. Harnesses 1 and 2 are for selvage only and the weave between the spots has been placed on 4 harnesses, although it repeats on 2 ends. This is to give a better distribution of the ends forming the ground of the cloth.

Dotted muslin is sometimes made by having the spots formed by extra warp ends. In such cases a box loom is not required. However, cloth similar to the sample is preferred, as the spots have a better appearance, due largely to the fact that a softer spun yarn can be used.

Such goods are finished plain, in colors and printed and are used for curtains, also for ladies' and children's wear.

SAMPLES 55 AND 55-A

Kind of cloth — Rayon Stripe
Width—Gray—36.5″ — Finished—36″
Sley—90 — Pick—60
Warp Counts—30^{s} cotton, 150 denier rayon.
Filling Counts—36^{s}
Weight of cloth—4.30 yds. per lb.

Selvage—2 per eye—4 per dent— 7 dents.
Weave—Plain weave, with rayon stripe.

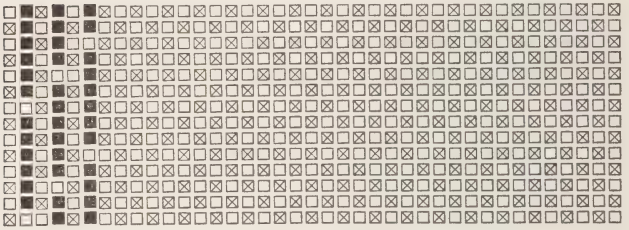


Fig. 58

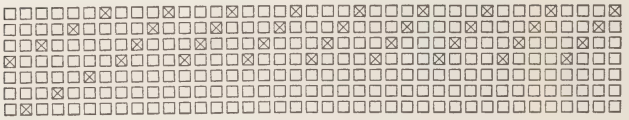


Fig. 59

Fig. 58 shows the weave.

Fig. 59 shows the harness, or drawing-in draft.

The ends weaving plain are drawn 3 per dent throughout the cloth, inside selvages. The 3 ends of rayon in each stripe are drawn in 2 dents. These rayon ends are drawn in the same dents as the plain ends, thus making 3 ends plain and 2 ends rayon in 1 dent, then 3 ends plain and 1 end rayon in 1 dent.

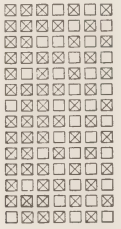


Fig. 60

Fig. 60 shows the chain draft.

Note that the weave for the rayon ends repeats on 7 picks, while the plain weave repeats on 2 picks. In order

to have these two weaves repeat together, it is necessary to carry the chain draft up to 14 picks, 14 being the least common multiple of 2 and 7. This is an important point and should always be taken into consideration when two or more distinct weaves are combined in the one cloth.

This cloth has been printed in the finishing and is used for men's, women's and children's wear, also for household purposes.

SAMPLES 56 AND 56-A

Kind of cloth — Shirting
Width—Gray—37.5″ — Finished—36″
Sley—80 — Pick—72
Warp Counts—32^{s} single, white and colored; 2 ply 32^{s}; 150 denier rayon.
Filling Counts—50^{s}.
Weight of cloth—4 yds. per lb.
Selvage—Ply yarn, 1 per eye—2 per dent—8 dents.
Weave—Fancy weave.

Fig. 61 shows the weave of this cloth.

Fig. 62 shows the harness, or drawing-in draft.

Fig. 63 shows the order in which the ends are drawn through the reed.

Fig. 64 shows the chain draft.

The different characters in Fig. 61 are used in the following manner:—

- ⊠ white yarn, single
- ■ white yarn, 2 ply
- ⊡ dark blue, single ends
- ▣ dark blue, extra warp ends
- ◙ light blue
- ▥ rayon

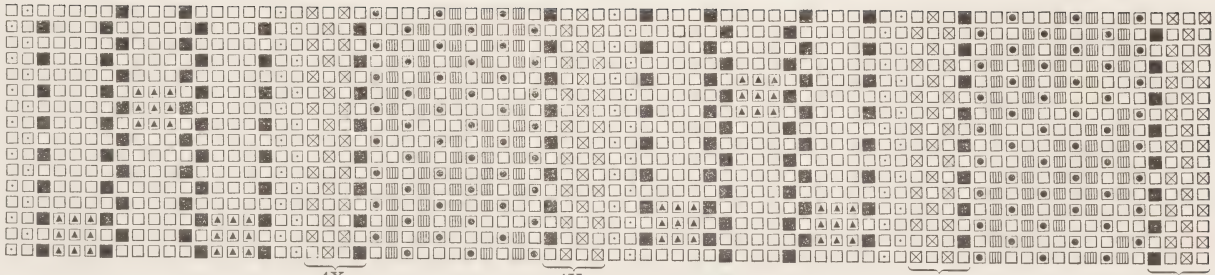


Fig. 61

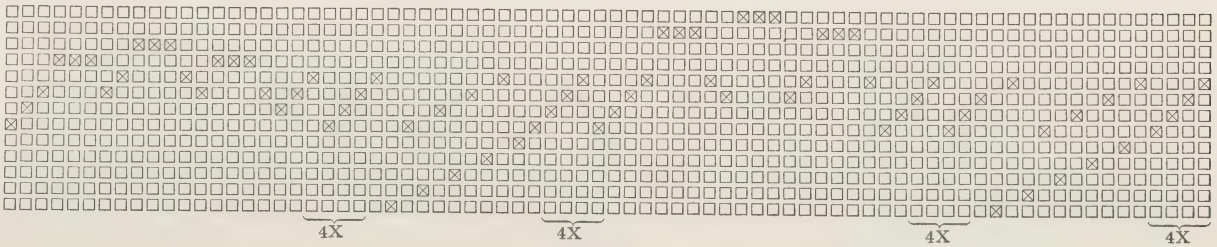


Fig. 62

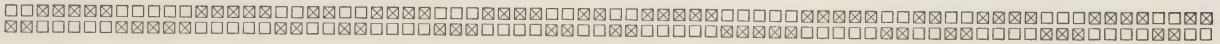


Fig. 63

The ends that are drawn through harnesses 10, 11, 12, 13 are shown in the harness draft as drawn through separate eyes. This has been done in order to show each individual end in the weave. In drawing these ends through the harnesses, however, where 3 consecutive ends are drawn through the same harness, as is the case here, they would be drawn through the same eye.

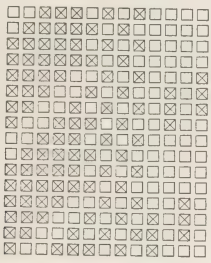


Fig. 64

There are several points in connection with this cloth that are of interest to the student of analysis.

The ends that work plain are drawn 2 per dent throughout the cloth, without regard to whether the ends are 2 ply, or single. The extra ends which form the spots, also the rayon ends in the rayon stripe, are drawn in the dents with the 2 plain ends, being divided in the dents as evenly as possible.

The corresponding spots, formed by the dark blue extra warp ends, do not start on the same pick in two adjacent stripes, consequently the ends forming these spots in one stripe cannot be drawn through the same harnesses as the ends forming the spots in the next stripe, but must have separate harnesses. This is due to there being an even number of plain ends between two spot stripes. If an extra plain end should be added between these two stripes, then the spot in one stripe could be started on the same pick as the corresponding spot in the next stripe, but, on the other hand, this would require 3 plain ends being drawn in 1 dent next to the stripe, instead of the regular 2 and would be confusing. Many questions of this

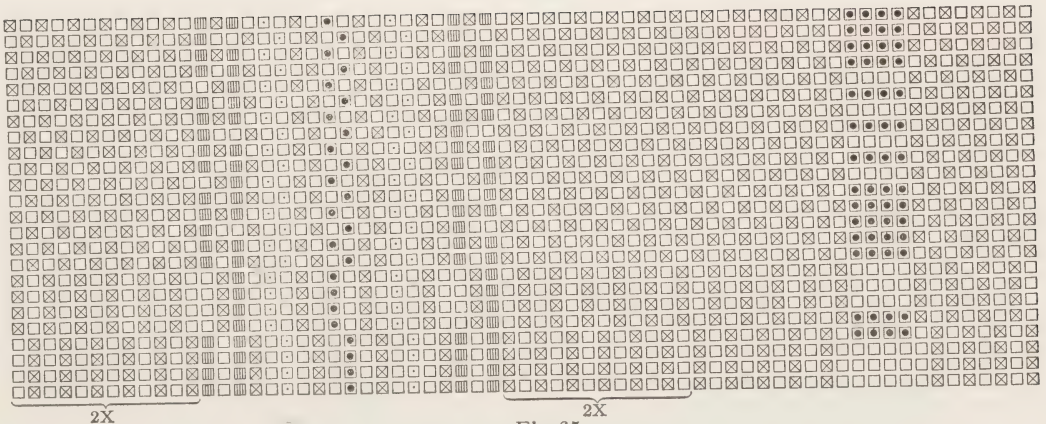


Fig. 65

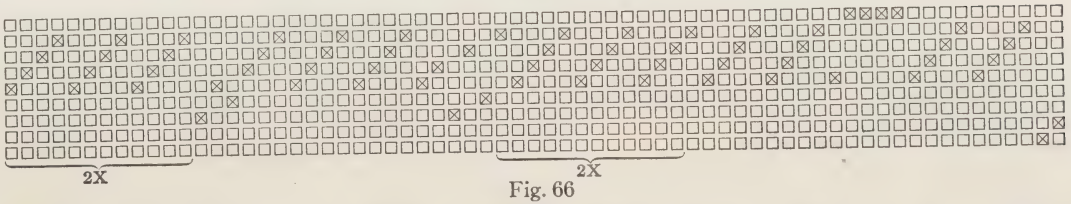


Fig. 66

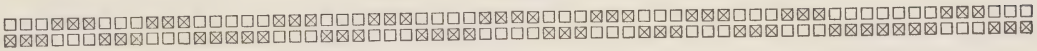


Fig. 67

nature constantly arise in fancy cloths and it is left to the designer to arrange the design in the least objectionable manner.

Cloths similar to the sample are used largely for men's wear.

SAMPLES 57 AND 57-A

Kind of cloth — Check Shirting
Width—Gray—37″ — Finished—36″
Sley—108 — Pick—60
Warp Counts—26^s cotton—150 denier rayon.
Filling Counts—45^s
Weight of cloth—3.65 yds. per lb.
Selvage—2 ply yarn—1 per eye—2 per dent —6 dents.
Weave—Fancy check weave.

Fig. 65 shows the weave of this cloth.

Fig. 66 shows the harness, or drawing-in draft, harnesses 1 and 2 being for selvage.

Fig. 67 shows the reed draft.

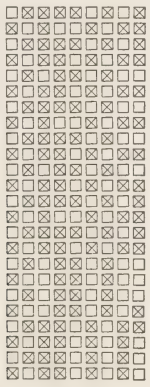


Fig. 68

Fig. 68 shows the chain draft.

The different characters in Fig. 65 are used in the following manner:—

⊠ white
◙ blue
⊡ brown
▥ rayon

Note that each individual end has been shown when drawn through No. 9 harness. These 4 ends would be drawn through the same eye of the harness, and work as one end.

Note that the ground ends of this cloth are drawn 3 per dent throughout the cloth and the extra ends, such as the rayon ends, and the 4 blue that work together, are drawn in the dent as extra ends with the 3 ground ends, the distribution being made as evenly as possible.

Cloths similar to the sample are used largely for men's wear.

SAMPLES 58 AND 58-A

Kind of cloth — Coutil
Width—Gray—38″ — Finished—36″
Sley—96 — Pick—70
Warp Counts—18^{s} Filling Counts—13.5^{s}
Weight of cloth—1.85 yds. per lb.
Selvage—Ply yarn—1 per eye—2 per dent —6 dents. Woven with a tape selvage motion.
Weave—2 up, 1 down twill, 7 ends right and then reverse, making 12 ends to one repeat.

Fig. 69 shows the weave of this sample, 4 repeats are shown in the picks.

Fig. 70 shows the harness, or drawing-in draft.

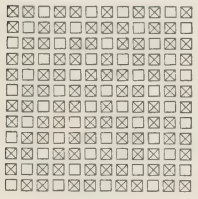


Fig. 69

Fig. 70

The ends are drawn 3 per dent in the reed.

This cloth is woven on a cam loom having the 2 up 1 down motion, 3 picks to the round. By means of drawing a certain number of ends through the harnesses in 1, 2, 3 order and then reversing and drawing a certain number in 3, 2, 1 order the effect shown in the cloth is obtained.

Coutils are difficult weaves as they are always high sley and high pick for the counts of yarn used.

One of the chief requisites in these cloths is strength, and for this purpose as many ends and picks as possible are crowded into the cloth.

Coutils are used chiefly in the corset trade.

SAMPLES 59 AND 59-A

Kind of cloth — Brassiere cloth
Width—Gray—36″ — Finished—35.5″
Sley—88 — Pick—78
Warp Counts—28^{s} cotton—150 denier rayon.
Filling Counts—22^{s}
Weight of cloth—3 yds. per lb.
Selvage—2 per eye—4 per dent—8 dents.
Weave—Fancy weave.

Fig. 71 shows the weave of this cloth.

Fig. 72 shows the harness, or drawing-in draft.

Ends drawn through harnesses 1 to 4 are drawn 2 per dent in the reed.

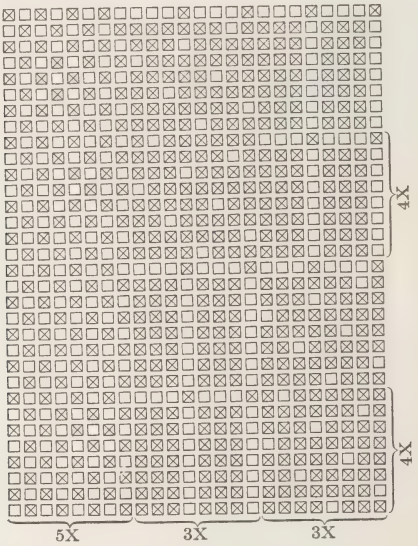


Fig. 71

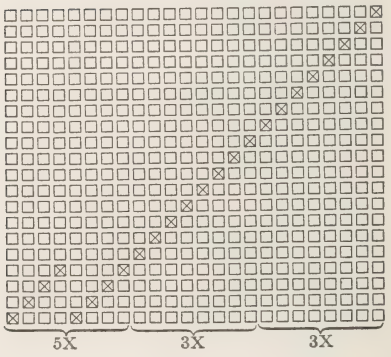


Fig. 72

Ends drawn through harnesses 5 to 20 are drawn 3 per dent in the reed.

Fig. 73 shows the chain draft.

These cloths are used in the corset trade.

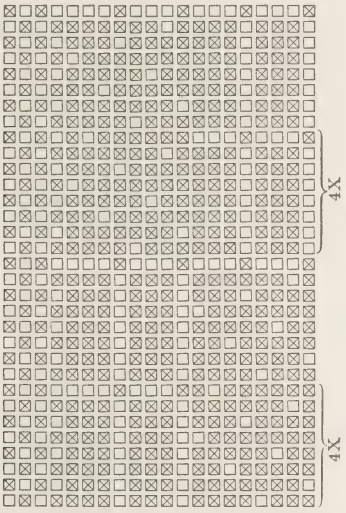


Fig. 73

SAMPLES 60 AND 60-A

Kind of cloth	Seersucker
Width—Gray—39″	Finished—39″
Sley—64	Pick—64
Warp Counts—28^{s}	Filling Counts—20^{s}

Weight of cloth—3.15 yds. per lb.

Selvage—2 per eye—4 per dent—10 dents.

Weave—Plain weave, woven on 2 harnesses.

Two beams are necessary to produce cloth similar to the sample, the ends forming the crinkle being placed on a top beam. The bottom beam is kept tight while the top beam has only sufficient friction placed upon it to produce a satisfactory shed during the weaving operation, and

allowing enough take-up to give the crinkle desired. Unless the top beam is well balanced, the warp will weave in faster on one side than on the other and to overcome this the yarn is sometimes carried around an easer bar at the back of the loom. A strap, having one end attached to this easer bar and the other end fastened to the lay sword, causes the easer bar to move in just as the reed beats up the filling to the fell of the cloth, thus easing the yarn from the top beam at each pick. With this arrangement more friction can be placed on the top beam.

This cloth is made in a large variety of patterns and with many combinations of yarns and colors. Rayon yarns are particularly effective.

It finds its principal use in draperies and bed spreads.

SAMPLES 61 AND 61-A

Kind of cloth — Sport Satin
Width—Gray—39″ — Finished—37″
Sley—86 — Pick—56
Warp Counts—150 denier rayon.
Filling Counts—35^{s}
Weight of cloth—5 yds. per lb.
Selvage—2 per eye—4 per dent—12 dents.
Woven with tape selvage.
Weave—5 harness warp sateen weave.

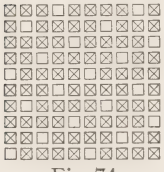


Fig. 74

Fig. 75

Fig. 74 shows the weave for this sample, 2 repeats in the ends and 2 repeats in the picks being given.

Fig. 75 shows the harness, or drawing-in draft, the figure gives 2 repeats.

The warp ends are drawn 2 per dent in the reed.

This cloth is woven on a cam loom.

These cloths are made also with 2 ply yarn for the filling. They are used for women's and children's wear.

The remaining samples in this work may be grouped under the one heading "Lenos" and since they introduce many new mechanisms and are constructed somewhat differently than the fabrics previously given, a description of the principles that underlie any leno weave, should be of assistance to the reader when studying the three samples given here.

The word leno is used to designate a weave that will cause a warp end to be up or down on one side of another warp end on one pick, and up or down on the other side of the same warp end on some other pick. That is, instead of having the warp ends lie parallel in the cloth as they do ordinarily, with a leno weave some of the ends are pulled out of a straight line, being on one side of certain ends on some picks and on the other side of the same ends on other picks.

There are many different loom attachments that have been devised to produce leno effects and it is not necessary to explain each one separately, the object here being to give the reader an understanding of the principles. In order to accomplish this, the mechanism that is best for descriptive purposes will be employed and not necessarily the one that may be best for the particular needs of any one weave.

In all leno weaves, at least two distinct groups of ends are employed, one group being known as the *ground* ends and the other group being known as the *doup* ends. The arrangement of these ends in the warp will be found to vary widely, but for the purpose of this description, it will be assumed that the ends are arranged 1 ground,

1 doup, 1 ground, 1 doup and so on throughout the warp.

With the ends arranged in this manner, four harnesses are employed to give the leno effect. The first harness at the front of the loom is known as the doup harness. In place of the ordinary heddles, this harness has attached to the bottom metal rod of the frame the two ends of as many twines as there are doup ends in the warp.

Next to the doup harness is what is known as the standard harness. This harness contains wire heddles that have double eyes in place of the single eye found in the ordinary wire heddle. Each twine on the doup harness has one end carried through the top eye of the standard heddle and back through the bottom eye of the same heddle, thus forming a loop at one side of the standard heddle. The third harness is set some distance back of the two front harnesses and is known as the ground harness. The fourth and last harness is known as the back harness.

These harnesses, also one each of the ground and doup

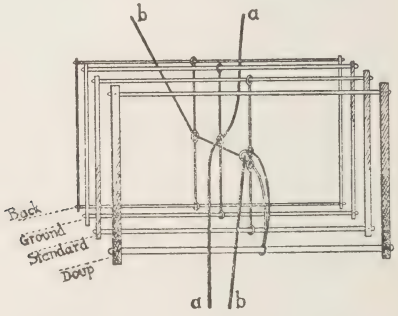


Fig. 76

ends, are shown in Fig. 76. The doup end *b*, is drawn through the back harness, also through the loop formed by the doup passing through the top eye of the standard heddle and back through the bottom eye. Thus this end may be lifted by the back harness, also by the doup and standard harnesses working together. The ground end, *a*,

is drawn through the 3rd harness, the heddle being at the right of the heddle on the back harness, through which the doup end is drawn. This ground end then passes over the doup end between the back harness and the doup and standard harnesses, so that it is at the left of the point where the doup end is drawn through the doup.

This method of drawing in these two ends is shown in

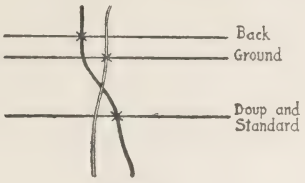


Fig. 77

Fig. 77. When it is desired to raise the doup end on the right of the ground end, the doup and standard harnesses are raised together and the ground and back harnesses are left down. When it is desired to raise the doup end on the left of the ground end, the back and doup harnesses are raised and the ground and standard harnesses are down. By raising the back harness, the doup end, which is drawn through this harness, is brought up, and since the doup harness is raised on the same pick, the doup is allowed to slip through the eyes of the standard heddle as it is pulled up by the doup end being raised. This is known as the open shed. The shed formed by the doup and standard being raised while the ground and back harnesses are down is known as the cross shed, since it is on this pick that the crossing of the ends takes place.

Figs. 76 and 77 show a left hand doup since the loop of the doup is at the left of the standard heddle. Doups may be either right or left hand.

The figures also show a bottom doup since the doups are fastened to the bottom of the doup harness. When fastened to the top of the doup harness they are known as top doups.

The two ends shown in Figs. 76 and 77 must be drawn through the same dent in the reed.

With a leno weave, such as is being described, the ground end is down on each pick and the doup end is up on each pick. However, in order to allow these two ends to cross they must be brought level. With a single action dobby, no additional attachment is needed, but with a double action dobby some arrangement must be devised to give this result.

One method is to have the ground harness attached to what is termed the jumper motion. This motion is operated by the rocker arm of the dobby and raises the ground harness to the center of the shed and then lowers it to the bottom on each pick.

The doup harness, instead of being attached to a strap that connects it with a dobby lever, is attached to what is

Fig. 78

termed the yoke, Fig. 78. This yoke has two loops in which work two dobby levers, *a* and *b*. *B* is connected directly to the standard harness. With this arrangement, when lever *a* is raised the doup harness is brought up, but when lever *b* is raised, both the doup and standard harnesses are raised. Thus if lever *a* is up on one pick and lever *b* is down, then on the next pick, lever *a* is lowered and lever *b* is raised, the action will allow the doup end to drop to the center of the shed where it is caught up and raised again to the top.

On cross shed picks, the back harness, through which the doup end is drawn, is down, while the doup end is raised by means of the doup and standard harnesses. This causes a strain on the doup end that must be relieved in

order to prevent breaking of the ends. This is accomplished by carrying the doup ends around an easer bar at the back of the loom. This easer bar is operated by means of one of the dobby levers, the harness chain being pegged to raise this lever and move the easer bar forward on each pick that the cross shed is formed.

A chain draft that will give a leno weave, using the

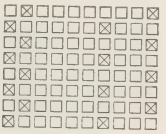


Fig. 79

attachments just described, is shown in Fig. 79. The weave repeats in 2 picks, although 8 picks are shown in the figure.

The doup harness is attached to the yoke that is operated by levers 1 and 2. The standard harness is operated by lever 2. The third harness, or the ground harness is operated by the jumper, consequently this harness is not considered when making the chain draft. The back harness has been attached to the 7th dobby lever and the easer bar is operated by the 10th lever. On the first, or bottom, pick, the doup and back harnesses are raised, thus forming the open shed. On the next pick the 2d lever is raised, which lifts the doup and standard harnesses, thus forming the cross shed. On this pick, the 10th lever is also raised, in order to bring forward the easer bar and relieve the strain on the yarn. The 3rd pick is a repeat of the 1st pick, and the 4th pick, a repeat of the 2d and so on.

SAMPLES 62 AND 62-A

Kind of cloth	Marquisette
Width—Gray—40″	Finished—41″
Sley—34	Pick—30
Warp Counts—42^{s} denier rayon.	Filling Counts—300

Weight of cloth—8.20 yds. per lb.
Selvage—2 per eye—4 per dent—12 dents—
2 ply yarn.
Weave—Plain leno, or gauze, weave.

Sample No. 62 is an example of cloth woven with the simplest form of leno weaves, and the explanations previously given apply directly to this cloth. The method of drawing in the warp ends and the manner in which the harnesses are raised and lowered follow the description given, consequently the weave, harness draft, and chain draft for this particular sample are not given. As previously stated there are many different ways in which cloth similar to the sample may be produced. Special reeds are sometimes used; also a wire doup has found considerable favor, and there is also a bead arrangement, but the object remains the same in all cases, namely, the raising of a certain end, or ends, on one side of another end on certain picks, and on the other side of the same end on other picks.

With a plain leno weave, such as is employed to construct cloth like the sample, all the warp yarn may be placed on the same beam, since the take-up is equal. The selvage ends, however, should be on a separate spool, and these ends have to be drawn through harnesses other than those employed to weave the body of the cloth. These selvage harnesses are usually placed between the doup and standard harnesses and the ground harness.

Cloth similar to the sample is used principally for curtain material.

SAMPLES 63 AND 63-A

Kind of cloth	Marquisette Spot
Width—Gray—34.5″	Finished—35″
Sley—36	Pick—18

Warp Counts—28^s Filling Counts—30^s
for ground—4^s for spot.
Weight of cloth—11.40 yds. per lb.
Selvage—1 per eye—2 per dent—14 dents
—2 ply yarn.
Weave—Plain leno ground, with an extra
filling spot.

Examining this sample of cloth, it will be noted that there are three sets of leno ends, each set working in a separate order. First, there are the ends that work plain leno throughout the length of the cloth. If all the ends worked in a similar manner to these ends, then the cloth would be a regular marquisette. Second, there are the ends that work plain leno part of the time, but have this order changed when the extra filling for one of the spots is inserted. Then there are the ends that work plain leno part of the time, but have this order changed when the filling for the other spot in a repeat is inserted, there being two spots in each repeat.

This calls for three sets of doup and standard harnesses, also three sets of ground and back harnesses. The doup and standard harnesses for the plain leno will be harnesses 1 and 2, while the ground harness for this set will be No. 9, and the back harness, No. 10.

The doup and standard harnesses for the leno ends that tie the extra filling for one spot will be harnesses 3 and 4, while the ground harness for this set will be No. 11, and the back harness, No. 12.

The doup and standard harnesses for the leno ends that tie the extra filling for the other spot in the repeat, will be harnesses 5 and 6, while the ground harness for this set will be No. 13 and the back harness, No. 14.

Harnesses 7 and 8 will be used for the selvage ends.

There are 16 ends between each spot and 4 ends for each spot, making 40 ends in one repeat of the pattern.

The above description will serve for the harness draft.

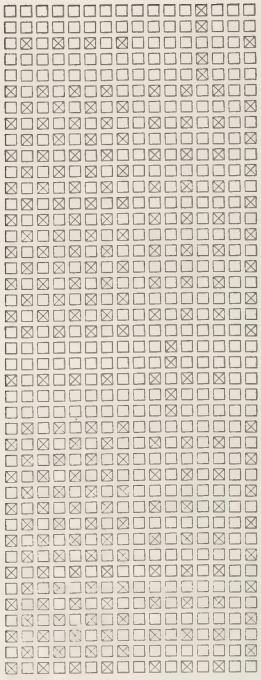


Fig. 80

The chain draft is shown in Fig. 80.

There are 16 picks between spots and 5 picks for each spot, making 42 picks to one repeat of the pattern.

The easer bar is operated by the 16th lever of the dobby and this lever is lifted on each cross shed pick, that is, where the doup and standard harnesses are brought up together.

Bottom doups are used and this would bring the loose picks of the extra filling on the top of the cloth, as it is woven in the loom, making the face of the goods the under side, when the loose filling is cut off.

This cloth is also used for curtain material.

SAMPLES 64 AND 64-A

Kind of cloth — Fancy Leno
Width—Gray—34″ — Finished—34″
Sley Reed—68 — Pick—18 ground
Warp Counts—28^s and 2 ply 30^s
Filling Counts—30^s
Weight of cloth—7.25 yds. per lb.
Selvage—2 per eye—4 per dent—12 dents.
Weave—Fancy leno weave.

The weave in this sample of cloth is a combination of a number of different weaves, and while each separate weave may not be difficult in itself, yet the complete weave is apt to be confusing.

However, since weaves of this character are very common with mills having fancy looms, and for the benefit of the reader who may wish to obtain a better understanding of their construction, this weave will be described in detail.

The description will be based on the previous explanations, in order that it may more readily be understood, and it will be assumed that the cloth is woven face up, using top doups where necessary, although in actual practice, a better method would be to weave the cloth face down, using bottom doups throughout, and employing some of the patented arrangements now on the market for leno weaving.

Each separate weave in the cloth, also, will be taken by itself and treated as an individual weave.

Examining the cloth sample, it will be found that there is a solid stripe, running warp ways of the cloth, and consisting of double ends that work plain throughout. There are 10 of these double ends, making 20 ends altogether in this stripe. These ends will be drawn on harnesses 7 and 8 and in making the chain draft, harnesses 7 and 8 should be made to work in plain order, that is 1 up, 1 down. When drawing in these ends, they are drawn 2 per eye.

On either side of this stripe are 2 pairs of ends, each pair working in plain leno order throughout the cloth. These ends will have the doup and standard harnesses placed as Nos. 3 and 4, and the ground and back harnesses will be Nos. 9 and 10. The chain draft for these leno ends, also for the ends in the solid stripe, is shown in Fig. 81.

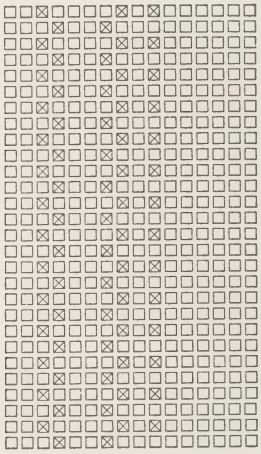


Fig. 81

No further explanation of this figure is necessary, since the leno weave is the same as found in previous samples.

The weave repeats on 28 picks.

Next to the ends that work in plain leno order throughout the cloth, are 8 pairs of ends that work in plain leno order for 17 picks, then in plain weave order for 5 picks, then 1 pick of leno, and then 5 picks of plain weave, making the 28 picks to the repeat. These ends will have the doup and standard harnesses as Nos. 5 and 6, and the ground and back harnesses as Nos. 11 and 12. The chain draft for this part of the weave is shown in Fig. 82.

The first 17 picks of Fig. 82 need no explanation, since these picks weave plain leno. Picks 18, 19, 20, 21 and 22

should be noted carefully as they show how the plain weave may be produced with leno ends. On pick 18 the doup and back harnesses of this set are raised, bringing the doup end over the pick of filling. On the next, or 19th, pick, the doup, standard and back harnesses are down, thus leaving the doup end down. The ground harness, however, is raised on this pick and the pick of filling passes under this end.

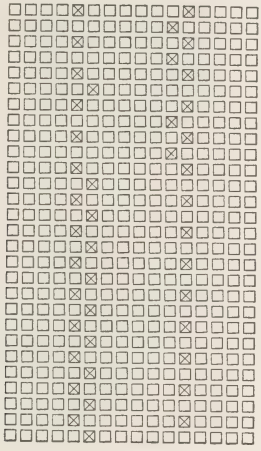


Fig. 82

On the 20th pick the doup end is again brought up by raising the doup and back harnesses, and the ground end is down. On the next pick the doup end is down and the ground end is raised. This order is followed for as many picks as may be desired, which in this case is 5. The 23d pick is a pick of leno and the standard harness is raised, giving a cross shed. Then follow 5 more picks of plain weave, which complete one repeat of the weave.

There remains one more set of ends and these form the diamond shaped effect. This is known as a face leno, and in order to weave this face up, top doups must be employed; also *right* and *left hand* doups, since some of the doup ends are down on the right of their ground ends, on

the same pick that the other doup ends are down on the left of their ground ends.

Examining the ground ends in this stripe it will be found that they do not all work alike, there being 2 separate orders of weaving in these ends alone, consequently 2 harnesses must be employed to operate the ground ends of this stripe, and they will be put on harnesses 13 and 14. The doup and standard harness for the doup ends will be 1 and 2, and the back harness for this set will be No. 15. The doup ends are drawn 3 per eye and the ground ends 2 per eye. The order of drawing in these ends is as follows—reading from left to right: 3 doup ends through harness 15, then through the doup on harnesses 1 and 2, this being a left hand doup—2 ends through harness 13, 2 through harness 14, 2 through harness 13; these six ends being brought *under* the doup end and crossing over to the left of the doup and standard heddle.

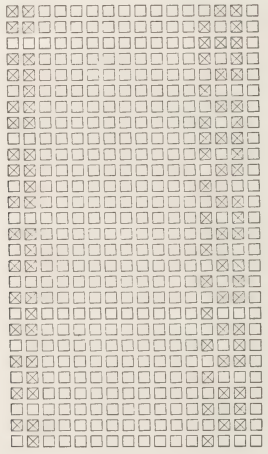


Fig. 83

Next come 2 ends through harness 13, 2 through harness 14, 2 through harness 13, then the doup end through harness 15 and also through a right hand doup on harnesses 1 and 2. The ground ends on this last set are drawn

through thé ground harnesses at the left of the heddle carrying the doup end for this set, then passes *under* the doup end, and to the right of the doup.

The chain draft for this portion of the weave is shown in Fig. 83.

Note that with top doups, when the open shed is formed, the doup and back harnesses are down and the standard harness remains up. When the cross shed is formed the doup and standard harnesses are down and the back harness is up. No mechanism, other than the regular dobby levers, is required to operate the ground harnesses in this weave, since there is at least one pick between an open and a cross shed, or between a cross and an open shed, which allows the doup and ground ends to pass each other when the crossing takes place. By combining the different chain drafts shown here, the completed draft for this sample of cloth will be obtained.

The three distinct sets of doup ends in this cloth form their cross sheds on different picks, consequently each set of doup ends must be carried around a separate easer bar and each bar must be operated on those picks on which the doup ends, controlled by their respective bar, form the cross shed.

Stop pegs should be inserted when the stripe across the cloth, filling way, is being woven.

Cloth similar to sample 64 is used largely for curtains.

IMPERFECTIONS COMMONLY MET WITH IN CLOTH AND SOME OF THEIR CAUSES

Thin Places—Let-off motion binding and causing the warp to be let off intermittently. Filling fork motion out of fix. Compensator not working when filling is changed. Take-up gears binding.

Thick Places—Let-off motion binding. Take-up motion

not taking up properly. Compensator allowing more than the required filling to be woven in a given space. Take-up gears binding and not allowing any backlash.

Thick and Thin Places or Unevenly Woven Cloth—Let-off motion binding. Take-up motion binding, also take-up gears being out of center. Uneven take-up rolls. Beam gudgeons not true. Cut gears are preferable for take-up motions.

Warp Ends Out—Stop motion out of order and careless weaving.

Double Ends—Careless weaving.

Warp Ends Weaving Under the Filling in Certain Places Where They Should Be Over the Filling—Harnesses not set correctly. Loom not picking properly.

Open Spaces Between Groups of Warp Ends, Technically Termed "Reedy Cloth"—Reed wires bent. Harness cams not timed correctly. Vibrator or whip roll too low. The chances of this defect occurring in the case of low sley goods may be lessened by drawing the ends one per dent.

Filling Picks Running Together in Groups of Two—Harnesses not set correctly. Whip roll not set correctly. The take-up pawl not being set correctly in the case of take-up motions that take up every other pick. Using a take-up motion that takes up on each pick helps to prevent this defect.

Filling Passing over Small Groups of Ends, Technically termed "Floats"—Careless weaving. Poor Yarn.

Filling not Interlacing Correctly, Technically Termed, "Mis-Pick"—Harnesses not working correctly. Weaver not matching the picks when the filling runs out.

Bunches of Filling Woven in Warp—Too much power on picker stick. Nose of filling bobbin not built correctly in spinning.

Wrong Filling, Dirty Filling, Oily Filling—Careless weaving.

Black and Dirty Filling Appearing Mostly at the Side of the Cloth—Shuttles and shuttle boxes not clean.

Continued on Page 160

Mount Hope Finishing Company

Mercerizers, Bleachers, Dyers and Finishers

SUN-FAST AND TUB-FAST COLORS

SILK, COTTON, RAYON AND CELANESE MIXTURES

CROSS-DYE EFFECTS ON RAYON FILLED FABRICS

Quickest possible service rendered by reason of extensive trucking facilities from the Grey Mills, Railroad and Steamship Terminals, to the Finishing Works.

FACTORY
North Dighton, Mass.

NEW YORK OFFICE
320 Broadway, New York City

For More Than 14 Years—

Specialists
in
Dependable
Textile Cost
Service

Over 20 Per Cent of All Cotton Textile Spindles in the United States are Operated by Clients Using Our Cost Methods!

Ralph E. Loper & Co.

Fall River, Mass.
Phone 6010

Greenville, S. C.
Phone 346

TOBACCO CLOTH

1. Gray

1-A. Finished

CHEESE CLOTH

2. Gray

2-A. Finished

BRETON MINEROL PRODUCTS

"Breton Minerol Process" (Patented)

"Breton" Minerol F
for finishing

"Breton" Minerol E
for fibre lubrication

"Breton" Oils
for Wool

"Crystal" Shear Oil

"Saxon" Apron Oil

"Crystal" Knitting Oil

Brilliant Oil AX
an emulsifiable lubricant

BORNE SCRYMSER COMPANY
17 BATTERY PLACE, NEW YORK

THE Lubricating Products and Processes bearing our name and symbol represent more than a half-century of step-by-step advancement in the art of Lubrication.

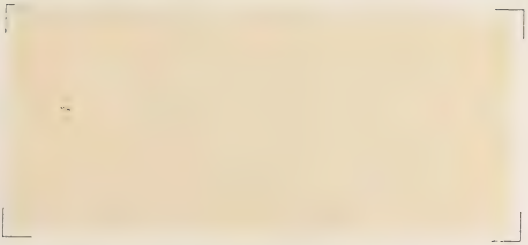
The selection of, and concentration upon, a restricted scale of industrial application has given a rich yield —*a distinctly specialized output.*

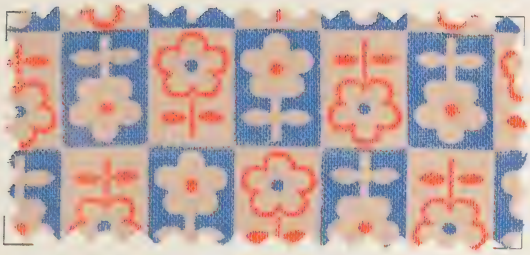
The wisdom of such a policy is reflected in the qualifications of our line, each item of which admirably performs its intended duty.

BORNE SCRYMSER COMPANY

17 BATTERY PLACE, NEW YORK

PRINT CLOTH

3.  Gray

3-A.  Finished

PERCALE

4. Gray

4-A. Finished

PRATT INSTITUTE
PHILADELPHIA

Narragansett Belting Co.

Providence, R. I.

Manufacturers

Oak Tanned Leather Belt

Loom Strapping :: Waterproof Cement

Leather Specialties For Textile Mills

Providence Mill Supply Co.

Providence, R. I.

Agents for the following Supplies

Genuine Atlas Brand Emery Fillet,
American Steel Hangers,
American Steel Pulleys,
Cold Rolled Shafting, Textile Crayons,
Roller, Slasher and Clearer Cloth,
Fibre Goods and General Mill Supplies

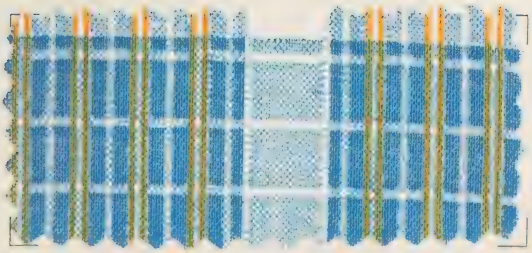
CRETONNE

5. Gray

5-A. Finished

IMITATION GINGHAM

6. Gray

6-A.  Finished

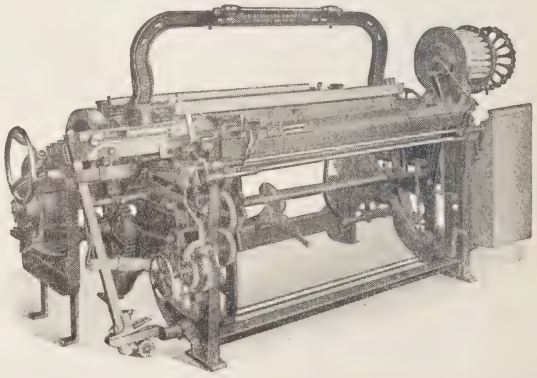
STAFFORD

WEAVING MACHINERY

STAFFORD automatic looms increase production, substantially reduce weaving costs, and produce fabrics unsurpassed in quality.

Outstanding characteristics of these looms are: Simplicity of design, accessibility of parts, and ease of operation. They can be supplied with either shuttle or bobbin-changing automatic features.

For full information address our nearest office.



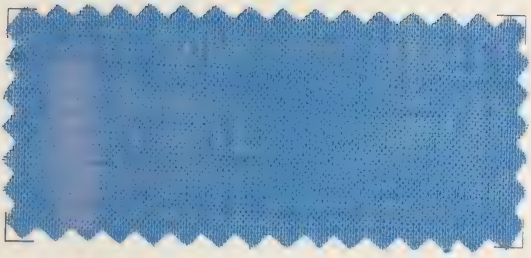
THE STAFFORD COMPANY

READVILLE, MASS.

CAMBRIC

7. Gray

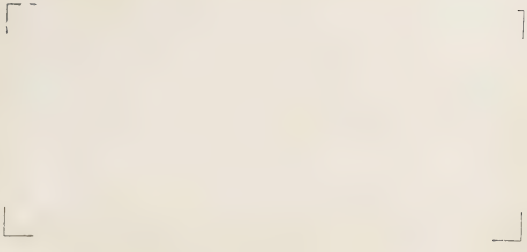
7-A. Finished



SHEETING

8. Gray

8-A. Finished



Because We Realize That

"THE SHUTTLE IS THE HEART OF THE LOOM"

We Spare No Effort or Expense in the Manufacture of

SHAMBOW SHUTTLES

Write us and we will have a Shuttle Engineer call on you to discuss your shuttle problems.

We have the right Spindle, the right Threader Eye, the right Tension and the right type Shuttle for the particular job you are doing on either.

Plain-Jacquard or Automatic Looms

SHAMBOW

Shuttles Exclusively

SHUTTLE - COMPANY

H. H. Ullman, President

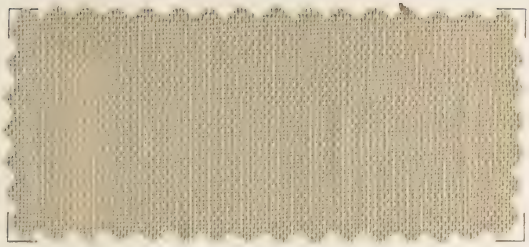
WOONSOCKET, R.I.

GREENVILLE, S.C. PATERSON, N.J.

SHEETING

9. Gray

9-A. Finished



INDIA LINON

10. Gray

10-A. Finished

Card Clothing
Napper Clothing
Heddles For Weaving
Hand Stripping Cards

We have been making these products for over sixty years, which means the best obtainable.

Howard Bros. Mfg. Co.

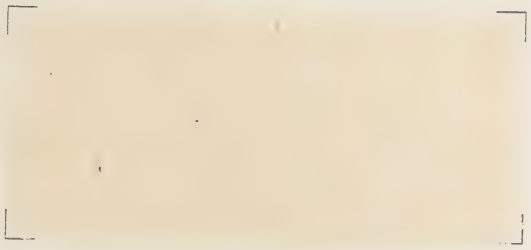
Established 1866

HOME OFFICE AND WORKS
44 Vine Street
Worcester, Mass.

BRANCHES

Philadelphia, Pa. **Atlanta, Ga.**

MUSLIN

11.  Gray

11-A. Finished

LONG CLOTH

12. Gray

12-A. Finished

Universal Standard Ring Travelers

U. S. Ring Travelers are uniformly tempered, which insures even-running spinning. They are also correct as to weight and circles.

Universal standard.

Quality guaranteed.

U.S. RING TRAVELER CO.

U. S. Ring Traveler Co.

159 Aborn Street, Providence, R. I.

ANTONIO SPENCER, *President* AMOS M. BOWEN, *Treasurer*

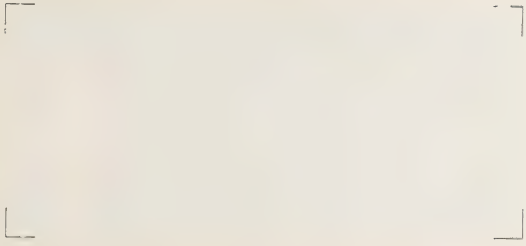
Southern Representative:

Wm. P. Vaughan

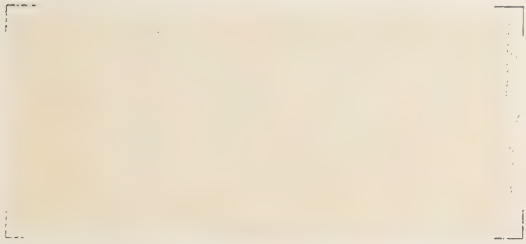
P. O. Box 792 **Greenville, S. C.**

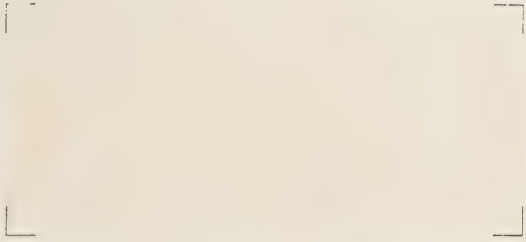
LAWN

13. Gray

13-A.  Finished

VOILE

14.  Gray

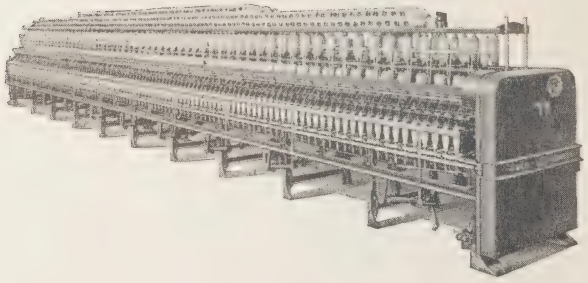
14-A.  Finished

SACO-LOWELL

Largest Manufacturers of Textile Machinery in America

The Three Essentials of Textile Machinery

ECONOMIC OPERATION
MAXIMUM PRODUCTION
RUGGED DEPENDABILITY



SACO-LOWELL MACHINERY
IS
DESIGNED AND BUILT
WITH THESE THREE QUALITIES
AS ITS FOUNDATION

It Pays to Install Modern Machinery

SACO-LOWELL SHOPS

Southern Office: CHARLOTTE, N. C.

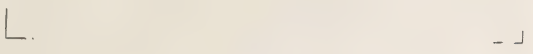
Branch Offices: GREENVILLE, S. C., and ATLANTA, GEORGIA

Main Offices:
147 MILK STREET, BOSTON, MASS.

SPLASH VOILE

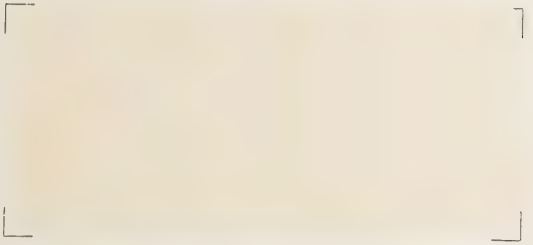
15. Gray

15-A. Finished

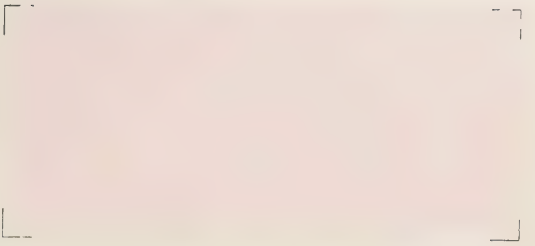


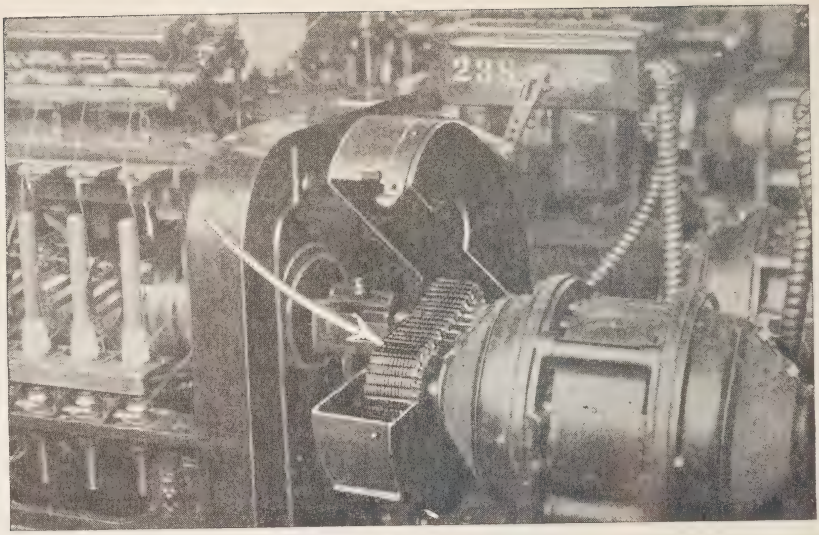
PONGEE

16. Gray



16-A Finished





Morse Silent Chain Drive from motor to spinning frame.

Good Power Drives insure better cloths

The use of MORSE SILENT CHAIN DRIVES by leading cotton mills has contributed greatly to the production of better cotton cloths. Constant speed ratio means a uniform product. Continuous operation at 98.6% efficiency means greater production and lower power costs. Adaptability to short centers means convenient machine spacing with good lighting conditions.

See how Morse Textile Drives are serving plants similar to your own. Consult the nearest office for complete data.

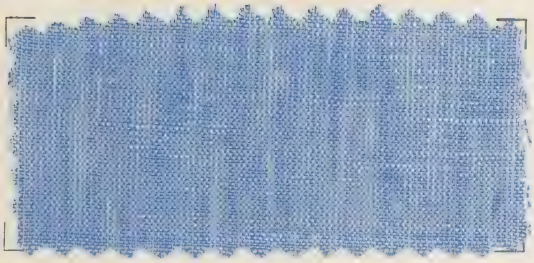
Morse Chain Co., Ithaca, N. Y., U. S. A.

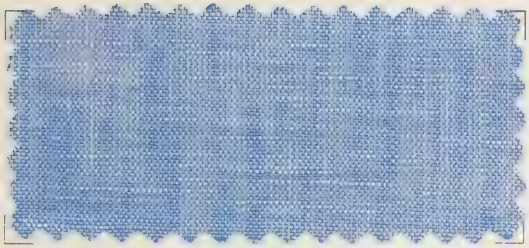
ATLANTA, GA.
BALTIMORE, MD.
BIRMINGHAM, ALA.
BUFFALO, N. Y.
BOSTON, MASS.
CHARLOTTE, N. C.
CHICAGO, ILL.
CLEVELAND, OHIO
DENVER, COLO.
DETROIT, MICH.
LOUISVILLE, KY.
MINNEAPOLIS, MINN.
NEW ORLEANS, LA.
NEW YORK, N. Y.
OMAHA, NEB.
PHILADELPHIA, PA.
PITTSBURGH, PA.
SAN FRANCISCO, CAL.
ST. LOUIS, MO.
TORONTO, 2, ONT., CAN.
WINNIPEG, MAN., CAN.

1968

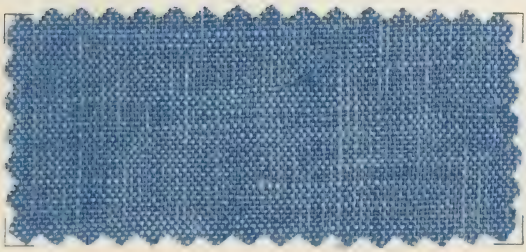
MORSE SILENT CHAIN DRIVES

CHAMBRAY

17.  Gray

17-A.  Finished

CHAMBRAY

18. 

Then
You Will Believe It

We're dead sure that Victors are the finest Ring Travelers you can buy, but you don't have to believe it just because we say so.

Tell us the styles and sizes you would like to try out, and we'll cheerfully send you *free samples*. Then see *for yourself* whether the *built-in* quality doesn't make a difference. Fair enough?

Victor Ring Traveler Co.

20 Mathewson Street, Providence, R. I.

Southern Agent, A. B. CARTER
Room 615, Third National Bank Bldg., Gastonia, N. C.

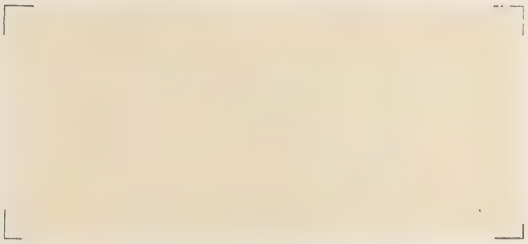
Southern Representatives

A. DEWEY CARTER :: N. H. THOMAS
Gastonia, N. C.

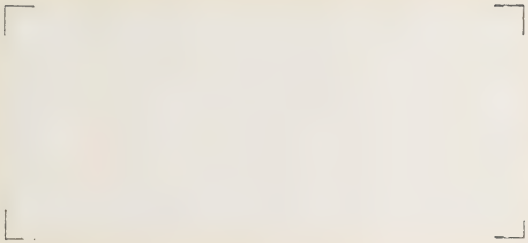
B. F. BARNES, JR.
520 Angier Avenue, N. E., Atlanta, Ga.

WINDOW HOLLAND

19. Gray

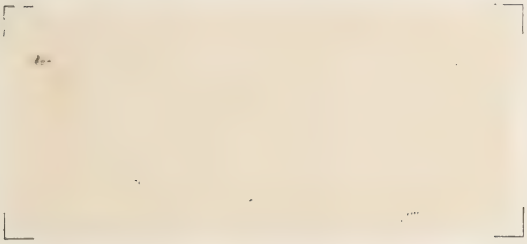


19-A. Finished



WINDOW HOLLAND

20. Gray



20-A. Finished

F. P. Sheldon & Son

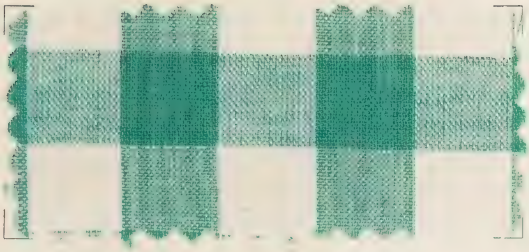
Providence, R. I.

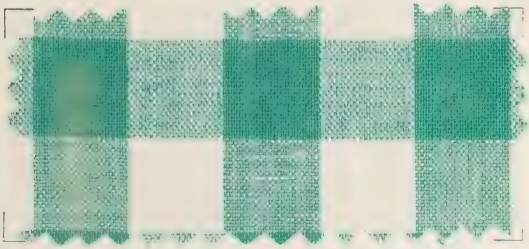
Engineers - Architects

Appraisers

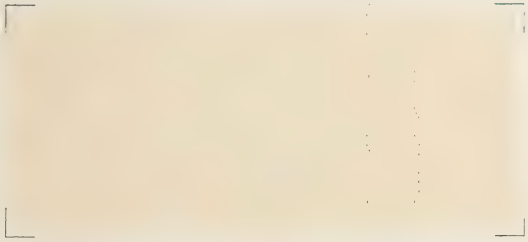
OUR services embrace the design, equipment and supervision of erection of all kinds of industrial structures as well as making financial reports, including appraisals, valuations, accounting data and business opportunities.

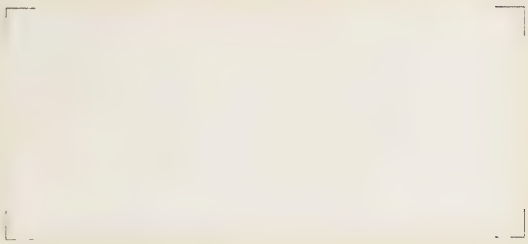
GINGHAM

21.  Gray

21-A.  Finished

POPLIN

22.  Gray

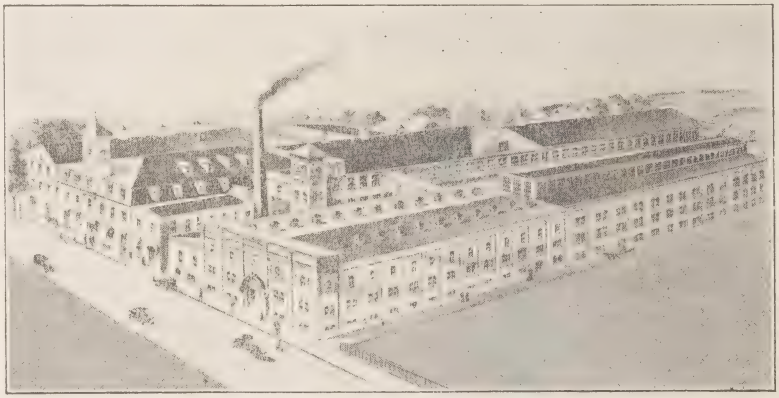
22-A.  Finished

1866 - 1927

Emmons Loom Harness Co.

Lawrence, Mass.

The Largest Manufacturers of Loom Harness and Reeds in America



COTTON HARNESS for all kinds of Plain and Fancy Weaves in Cotton, Linen and Silk.

MAIL HARNESS for Duck, Worsted, Silk and Woolen Goods.

SPECIAL MAIL for Single Duck, Drills, and Osnaburgs.

BAKED ENGLISH HARNESS for Broad Silks and Ribbons.

SELVAGE HARNESS for Weaving Tape Selvages, any depth up to 24 inches.

REEDS for Cotton, Woolen, Silk and Duck Mills.

Mail Jacquard Heddles, Mending Eyes, Beamer and Dresser Hecks, Warper and Leice Reeds, Slasher and Striking Combs.

SOLE AGENTS FOR WARDWELL PICKERS

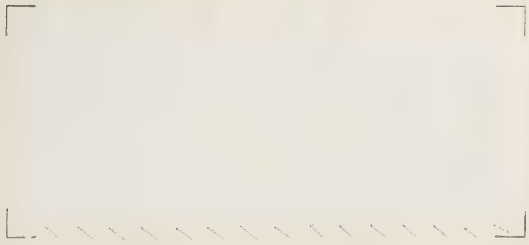
COTTON FLANNEL

23. Gray

23-A. Finished

DUCK

24. Gray

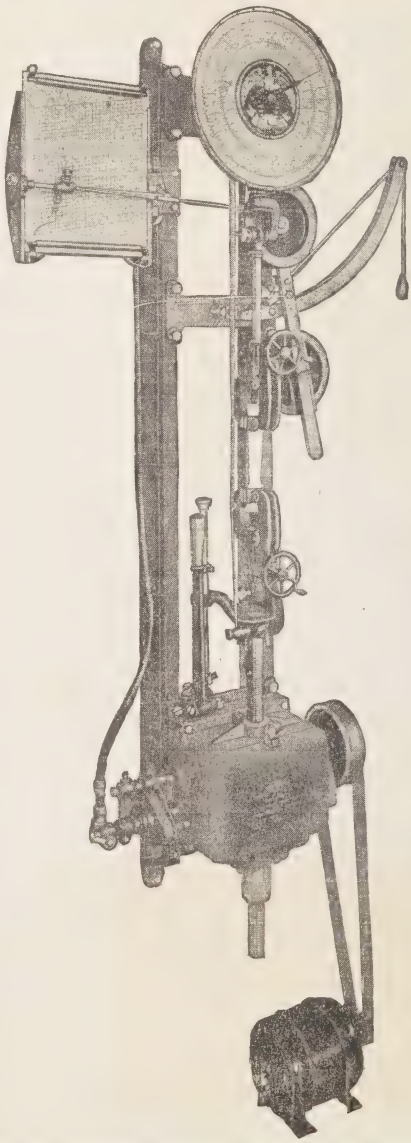
24-A.  Finished

Henry L. Scott Co.

Established 1899

Providence, R. I.

Incorporated 1925



Builders of World Standard Cloth Testers

OXFORD

25. Gray

25-A. Finished

OSNABURG

26.

WILLIAM H. HAYWARD,
President

EDWARD M. JOHNSON,
Vice President and Treasurer

Arnold, Hoffman & Co., Inc.

ESTABLISHED 1815

Providence, R. I.
Boston, Mass.

Charlotte, N. C.

New York, N. Y.
Philadelphia, Pa.

Importers and Manufacturers of

Starches, Gums, Dextrines and Specialties for Sizing, Softening and Finishing Cotton, Woolen and Worsted Fabrics

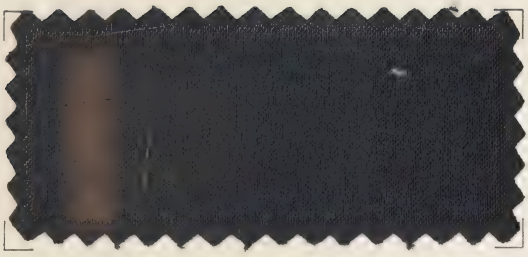
Special attention given by practical men to specialties for Sizing, Softening, Finishing and Weighting Cotton, Woolen and Worsted Fabrics, combining the latest European and American methods.

We believe there is no problem in Sizing or Finishing that we cannot solve.

Formulas for the best method of obtaining any DESIRED FINISH on any fabric cheerfully given.

UMBRELLA CLOTH

27. Gray



27-A. Finished

3 LEAF TWILL

28. Gray

28-A. Finished

Whitin Machine Works

Established 1831

Whitinsville, Mass., U. S. A.

Manufacturers of the Following Machines

COTTON MACHINERY

Cleaning
Opening
Conveying
Distributing
Picking
Revolving Flat Cards
Sliver Lap Machines
Ribbon Lap Machines
Combing Machines
Drawing Frames
Roving Frames
Spinning Frames
Spoolers
Twisters
Reels
Quillers
Loom Dobbies
Filling Winders

COTTON WASTE MACHINERY

COTTON AND WOOLEN SYSTEMS

Openers
Pickers
Willows
Card Feeds
Full Roller Cards
Condensers
Revolving Flat Cards
Hard Waste Machines
Derby Doublers
Roving Frames
Spinning Frames
Twisters
Spoolers

WOOLEN MACHINERY

Card Feeds
Full Roller Cards
Condensers
Wool Spinning Frames

SILK MACHINERY

Ring Twisters
Spoolers

WORSTED MACHINERY

Cone Roving Frames
Twisting Frames
Cap Spinning Frames

SUPPLIES

Rings, Spindles, Rolls
Flyers, Hank Clocks and Roll Spreaders
MaGrath Clutches
Bunch Builders

CHARLOTTE, N. C. **ATLANTA, GA.**

DRILL

29. Gray

29-A. Finished

DENIM

30.

Economical to Run and A Dividend-Earner

The Mill with Northrop Looms has nothing to fear from the Weaving Equipment of its Competitors.

A Weaver can run more Northrop Looms than any other loom ever produced. Mill Records prove it.

If this interests you, **Let's Talk It Over.**

DRAPER CORPORATION

HOPEDALE MASSACHUSETTS

SOUTHERN OFFICE: ATLANTA GEORGIA

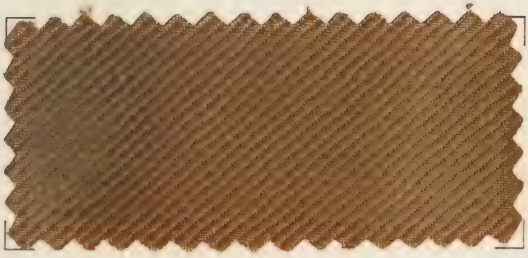
4 LEAF TWILL

31. Gray

31-A. Finished

ALBERT TWILL

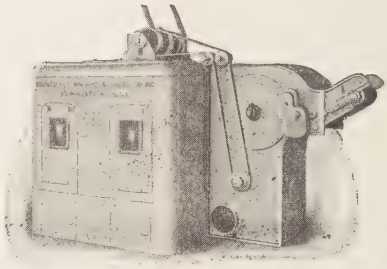
32. Gray

32-A.  Finished

Complete Equipment

Cotton Machinery

Built by Specialists

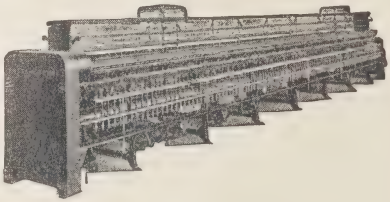


Cotton Opening, Conveying, and Picker Room Machinery, Revolving Top Flat Cards, Drawing, Slubbing, Intermediate and Roving Frames.

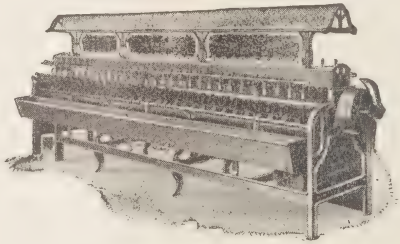
Woonsocket Machine & Press Co., Inc.

WOONSOCKET, R. I.

Ring Spinning Frames, Ring Twisters for Cotton, Wool, Worsted, Silk, Linen, Jute and Novelty Yarns.



Fales and Jenks Machine Co., Pawtucket, R. I.



Spooling and Warping Machinery, Reels, and Skein Winders.

Auto Banding Machines, Card Grinders and Spindles.

Easton & Burnham Machine Co.

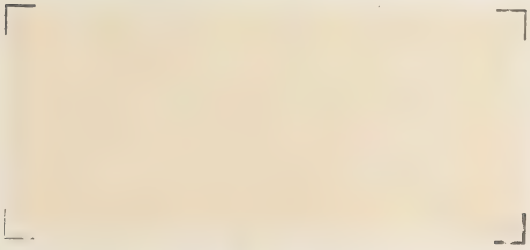
Pawtucket, R. I.

Northern and Export Agent
PAWTUCKET, R. I.

Southern Agent
GREENVILLE, S. C.

5 END WARP SATEEN

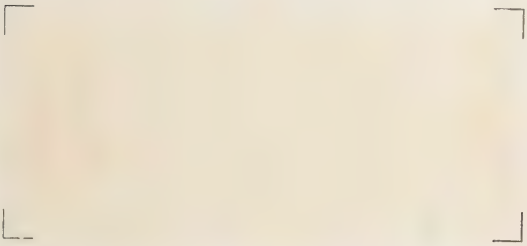
33. Gray



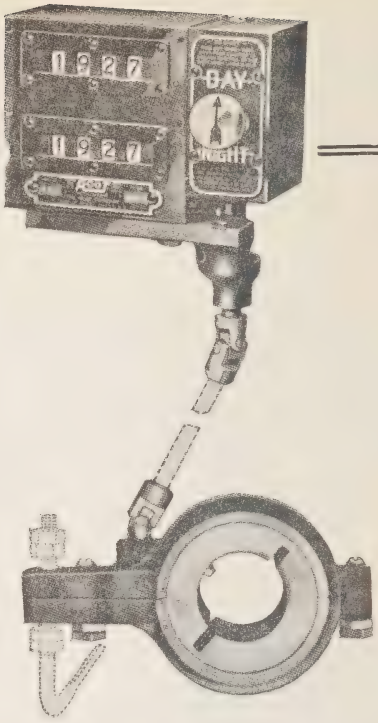
33-A. Finished

5 END FILLING SATEEN

34. Gray



34-A. Finished



For Bringing About Standardization and Uniformity in Cotton Cloths

Root Pick Counters have played an important part in the standardization and high efficiency of present day representative mills.

These little "watch dogs of production" eliminate the uncertainties and inaccuracies so common where yardage is the unit of measure.

Each pick is unfailingly recorded—estimated and finished production are in certain agreement—accurate, dependable figures are constantly available for plant officials—workmen are inspired to do more and better work—defects in material more easily prevented.

In fact no one improvement of greater consequence can be added to your looms.

Write for our free booklet, "The Advantages of Paying by the Pick".

THE ROOT COMPANY

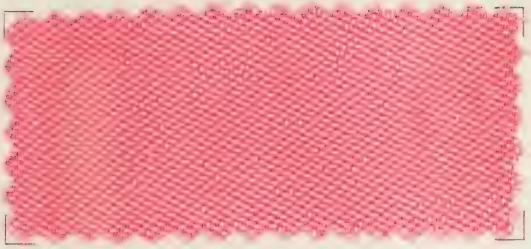
BRISTOL, CONNECTICUT

ROOT

PICK COUNTERS

8 END FILLING SATEEN

35. Gray

35-A.  Finished

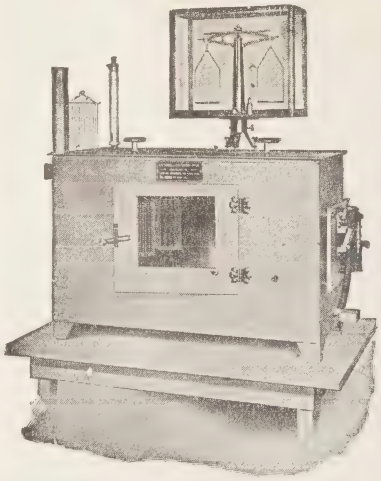
LINGETTE

36. Gray

36-A. Finished

EMERSON

Textile Conditioning Ovens



Eight Basket Oven
Capacity 900 watts
8 Baskets 3 in. x 3 in. x 6 in. deep
or
6 Baskets 4¼ in. x 4¼ in. x 6 in. deep
Baskets carrying from 2 to 4 ounces of material

For Determining The Moisture in Textiles, whether Raw Materials or Goods in Process

The regular Strength tests of fabrics must take into account the moisture condition of the fabric in question and this can only be determined by means of a conditioning oven.

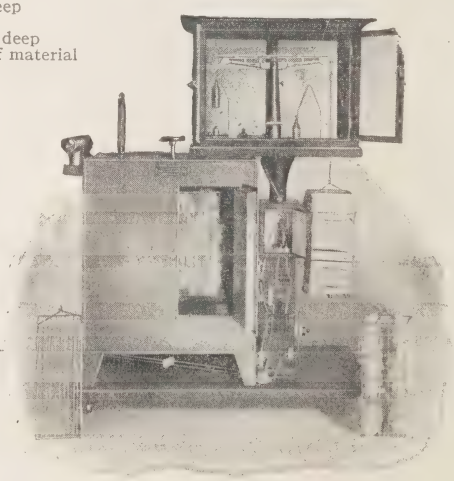
We manufacture four different styles and sizes of ovens.

WRITE US

Emerson Apparatus Co.

Melrose Highlands

MASS.



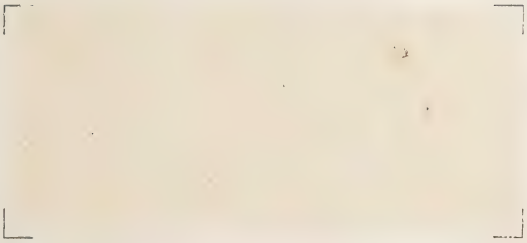
Four Basket Oven
Floor Space 6 ft. x 4 ft.
Baskets designed to hold up to one pound sample
Baskets 7 in. x 7 in x 18 in. deep
Capacity 2000 watts

CREPE

37 Gray

37-A. Finished

EMBOSSED CREPE

38.  Gray

38-A. Finished

SPINNING RING SPECIALISTS SINCE 1873
SPINNING RINGS
TWISTER RINGS
SILK RINGS
DIAMOND FINISH
TRAVELLER CLEANERS
TRAVELLER CUPS
GUIDE WIRE SETS
WHITINSVILLE
SPINNING RING CO.
WHITINSVILLE, MASS.

BROADCLOTH

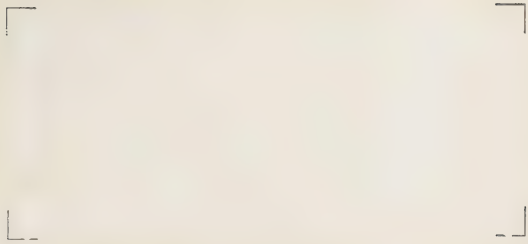
39. Gray

39-A. Finished

BROADCLOTH

40. Gray

40-A. Finished



Litchfield Shuttle Co.

Established 1843

SOUTHBRIDGE, MASS.

Manufacturers of

Shuttles *and* Shuttle Parts

of every description

Agents for

THE "ROLL-IN" THREAD CLAMP

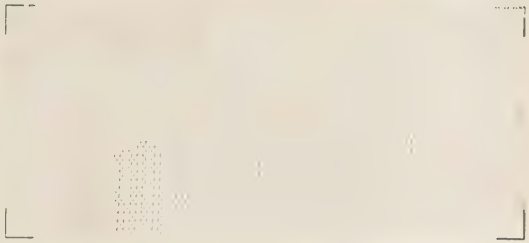
Southern Agent

JAMES J. MONTAGUE

1206 W. 6th Street, Charlotte, N. C.

ALPACA

41. Gray

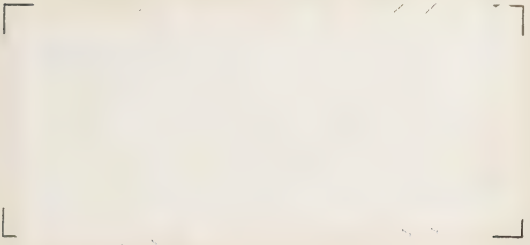


41-A. Finished

WARP REP

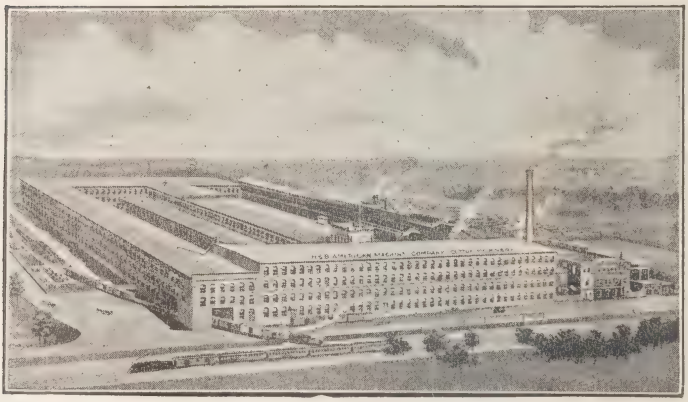
42. Gray

42-A. Finished



H & B
AMERICAN MACHINE COMPANY
PAWTUCKET, R. I.

COTTON MACHINERY



——WE BUILD——

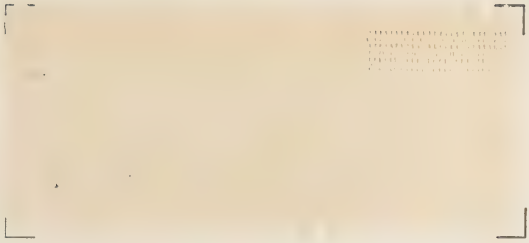
HOPPER BALE OPENERS
CRIGHTON OPENERS—EXHAUST OPENERS—BUCKLEY OPENERS
ROVING WASTE OPENERS—SELF-FEEDING OPENERS
COTTON CONVEYING SYSTEMS
BREAKER—INTERMEDIATE AND FINISHER LAPPERS
REVOLVING FLAT CARDS—DRAWING FRAMES
SLUBBING—INTERMEDIATE—ROVING FRAMES
SPINNING AND TWISTERS
(Band or Tape Driven)
SPINDLES—FLYERS—RINGS—FLUTED ROLLS

Descriptive Bulletins sent on request

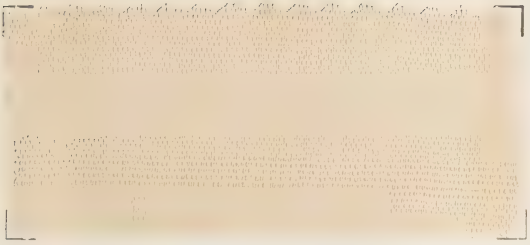
SOUTHERN OFFICE
815 Atlanta Trust Co. Bldg.
ATLANTA, GA.

HIMALAYA CLOTH

43. Gray



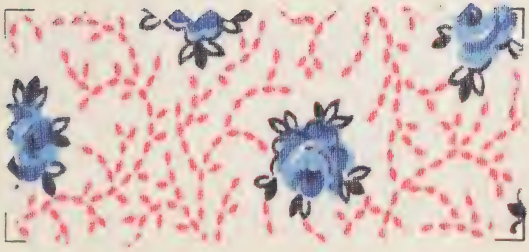
43-A. Finished



DIMITY

44. Gray

44-A. Finished



Better Bobbins, Shuttles, and Spools are Necessary for Better Fabrics

For many years the U S Bobbin and Shuttle Company has been among the foremost in building better bobbins, shuttles, and spools. Each new development in looms and fabric has found our engineers ready to meet the demand for special equipment.

U S Shuttles, both in plain and automatic, have long been the choice of many weavers who judge by quality, service, and performance, for use in cotton, woolen, worsted, plush, silk, duck, and carpet looms.

U S Spools and Bobbins of all types are the recognized standard of quality throughout the textile industry.

U S No. 2 Eye with Daudelin Talbot Wire Guard

U S service men are always ready to assist in developing special equipment to meet unusual conditions. When you need bobbins, shuttles, or spools, call on U S for experienced service and quality materials.

U S Bobbin & Shuttle Co.

Providence, R. I.

Branch Offices:

Greenville, S. C. — **High Point, N. C.**
Philadelphia, Pa. — **Atlanta, Ga.**

Factories:

Greenville, Lowell, Goffstown, Willoughby, Lawrence, Newtown, Auburn, Manchester

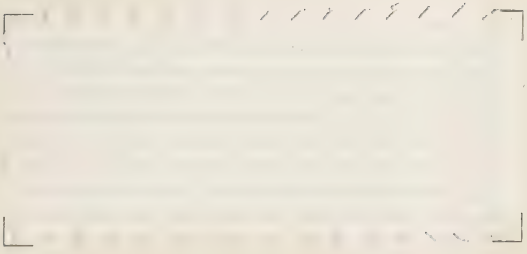
BEDFORD CORD

45. Gray

45-A. Finished

PIQUE

46. Gray

46-A.  Finished

Beginning of a New Era in the Spinning Room

Wentworth
Double Duty Traveler

New Development
For Coarse Spinning

Less Loading
More Even Yarn
More Production

If your spinning is not perfect we can improve it.

Write us for information

Wentworth
Gravity Traveler

New Development
For Fine Spinning

More Even Yarn
More Production

National Ring Traveler Co.
PROVIDENCE, R. I.

PHILIP C. WENTWORTH, Treasurer

Southern Distributing Depot
31 West 1st Street, Charlotte, N. C.

Southern Agent
C. D. TAYLOR

PAJAMA CHECK

47. Gray

47-A. Finished

MOCK LENO

48. Gray

48-A. Finished

John Hetherington & Sons, Ltd.

Manchester, England

Makers of

High Grade Textile Machinery

We are the Makers of

The Improved 'ORIGINAL' Nasmith Combing Machine

The Patented New Model Nasmith Combing Machine

TWIN-SIX SINGLE-SIX

Some Hetherington Products

Hopper Bale Opener
Willow
Waste Shaker
Fearnought
Roving Waste Opener
Automatic Feeders
Creeper Feeds
Creighton Exhaust & Large Cylinder Openers
Single & Double Pickers
Rev. Flat Cards
Cards for Wool, Waste and Worsted, with various kinds of feed
Worsted cards fitted with various Burring Apparatus
Tape or Ring Doffer Condensers
Derby Doubler
Sliver lap machines
Ribbon lap machines
Combing machines
Drawing frames
Speed frames
S. A. Mules for Cotton
S. A. Mules for Cotton Waste
S. A. Mules for Wool and Worsted
S. A. Twiners (*French or Yorkshire*)
Ring Spinning Frames for cotton and cotton waste
Ring Twisters
Winding Frames
Single or Double Reels
Bundling Presses
Cable, Cord and Banding Machines
Roller Truing Machines

Complete Installations for Artificial Silk Producing Plants

Send for descriptive pamphlets of our machinery

Sole Agent U. S. and Canada

Herbert Harrison

Room 561, 49 Federal Street **Boston, Mass.**

TWILL CHECKERBOARD

49. Gray

49-A. Finished

HONEYCOMB

50. Gray

50-A. Finished

THE SHUTTLE PEOPLE

Seasoned
Wood

Satisfactory
Workmanship

Superior
Shuttles

Also Heddles and
Heddle Frames

The J. H. Williams Co.

Millbury, Massachusetts

NAINSOOK CHECK

51. Gray

51-A. Finished

PILLOW TUBING

52.

CURTIS & MARBLE MACHINE COMPANY

72 Cambridge Street

WORCESTER, MASSACHUSETTS

Cloth Room and Packaging Machinery

Durrant Automatic Cloth Guiders

MACHINES FOR

Inspecting	*Brushing*	*Stamping*
Sewing	*Calender Rolling*	*Winding*
Singeing	*Measuring*	*Folding*
Shearing	*Trade-Marking*	*Doubling*

Finishing Machinery for Woolen, Worsted and Felt Goods, Carpets, Plushes, Silks, Embroideries, Rubberized Fabrics, etc., Picking, Burring and Mixing Machine for Wool or Mixed Stock.

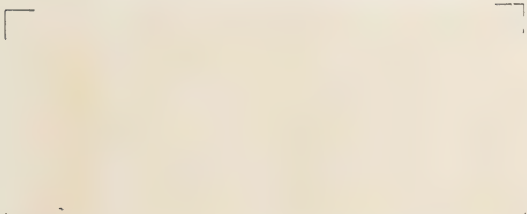
Southern Office: **Greenville, S. C.**

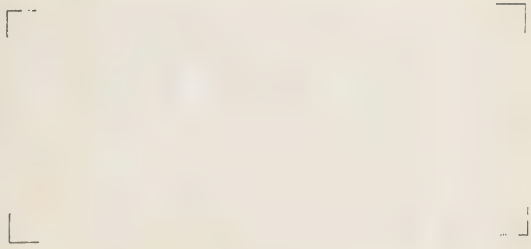
BRILLIANT SPOT

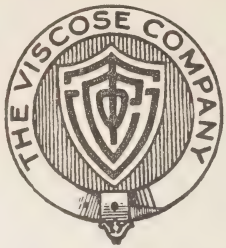
53. Gray

53-A. Finished

DOTTED MUSLIN

54.  Gray

54-A.  Finished



It is often said among

Prominent Textile Men

"After experimenting with various makes of rayon, we are now using the Viscose Company product"

This is a natural statement because the Viscose Company is the pioneer of the rayon industry. Since the first plant was built in 1911 no effort or expense has been spared in giving the textile industry the most superior rayon that can be manufactured. These years of experience have raised the quality of the Viscose Company's yarns so that today they are the standard of the market.

Mills everywhere are using this fine rayon. Their dyers say it takes color more uniformly. Mill operators prefer it because of its better manipulating qualities and the resultant increased production. Jobbers and retailers like it for its dependability and the public appreciates its beauty and durability.

At your disposal are the four great Viscose plants, the largest combined rayon producing unit in the World; a highly trained staff of rayon chemists and an established reputation for producing the finest yarns.

Sales Offices

171 Madison Avenue, New York, N. Y.

PHILADELPHIA, PA. 403 Atlantic Bldg.
PROVIDENCE, R. I. 1017 Hospital Trust Bldg.
CHARLOTTE, N. C. 607 Johnston Bldg.

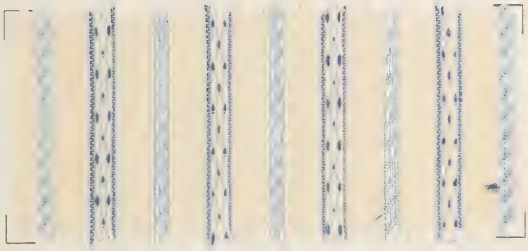
RAYON STRIPE

55. Gray

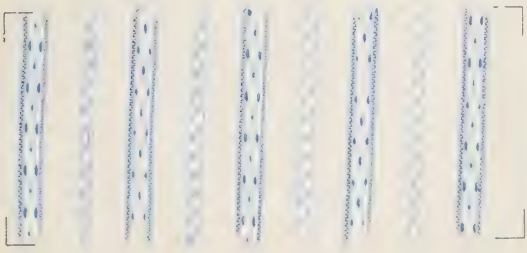
55-A. Finished

SHIRTING

56. Gray



56-A. Finished



Better Humidity Means Better Weaving

IT would be impossible to economically and satisfactorily weave the patterns opposite without humidity. And the better the humidity conditions, the better the weaving.

Investigation will show you that better humidity is in reality better control of conditions. That's why scores of mills are scrapping their present controls and installing the Amco Humidity Control. It is simpler, much more accurate and less expensive than any other control.

This development is revolutionary. It does away with wet and dry bulb elements altogether and uses an animal membrane for a hygroscopic element. This membrane is affected only by humidity—not by temperature.

If you have no humidifying equipment you want the best. If you already have a system make it better by installing the Amco Control.

Send for pamphlet carrying complete description of operation and parts of the Amco Control

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American Moistening Company

"Since 1888—Reliable Humidifying Devices"

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PROVIDENCE, R. I.

79 Milk Street
BOSTON, MASS.

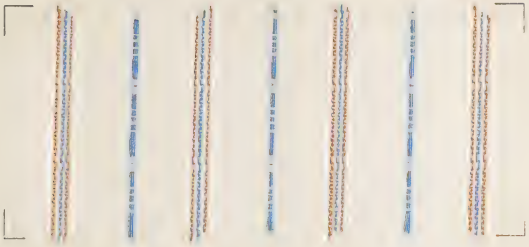
30-32 East Fourth Street
CHARLOTTE, N. C.

GREENVILLE,
S. C.

276 Marietta Street
ATLANTA, GA.

CHECK SHIRTING

57. Gray

57-A.  Finished

COUTIL

58. Gray

58-A. Finished

STEEL HEDDLE MFG. CO.

21st Street and Allegheny Avenue :: Philadelphia, Pa.

Manufacturers of

Flat Steel Heddles and Universal Frames
Doup or Leno Heddles
Flat Steel Jacquard Heddles and Lingoes
Velvet and Plush Heddles
Lancettes and Pile Wires
Drop Heddles and Wires
Soldered and Pitched Reeds
of every description

Special RAYON HEDDLE with super finish for weaving Celanese and Rayon fabrics

Harness Frames and Heddles

for

Cord and Duck Fabrics
Belting and Asbestos Lining
Wire Cloth of any mesh Narrow or Tape Fabrics
Broad Silk and Ribbons

Branch Offices and Factory:

621 E. McBEE AVENUE, GREENVILLE, S. C.
44 FRANKLIN STREET, PROVIDENCE, R. I.

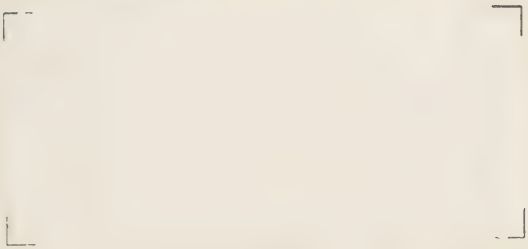
BRASSIERE CLOTH

59. Gray

59-A. Finished

SEERSUCKER

60. Gray

60-A.  Finished

LEESONA for RAYON WINDING

RAYON is one of the most delicate fibres in existence, hence the winding machines that prepare it for weaving or knitting must be precise and delicate as to adjustment. Many also believe in the rule, "the fewer winding operations the better".

There are Universal Winding Machines specially perfected to fulfill these requirements:—

No. 50 SKEIN TO CONE WINDER

handles successfully 75 to 300 Denier rayon direct from skeins, giving a higher spindle production than other machines used for package winding. Cones wound in this way deliver freely in the knitting machine and are exceptionally free from stranded rayon, thus reducing waste and assuring a more nearly perfect fabric.

No. 90 FILLING WINDER

can be furnished with swift attachment if desired and can be adapted for cop, tube, or bobbin winding by a slight change in attachments. Uniformity of tension is assured by a sensitive compensating device. Oil is distributed automatically to all working parts from a lint-proof reservoir.

What is your winding problem with reference to Rayon?

Our experience is at your service on practical rather than theoretical lines.

UNIVERSAL WINDING COMPANY

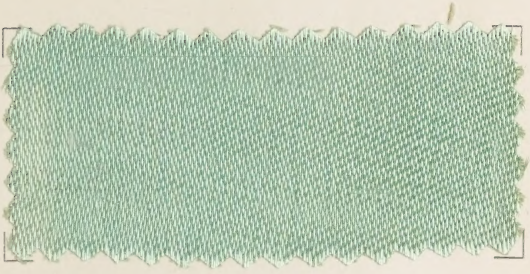
PROVIDENCE
CHICAGO, UTICA BOSTON PHILADELPHIA
NEW YORK CHARLOTTE
MONTREAL AND HAMILTON, CANADA ATLANTA

DEPOTS *and* OFFICES *at* MANCHESTER *and* PARIS

UNIVERSAL WINDING

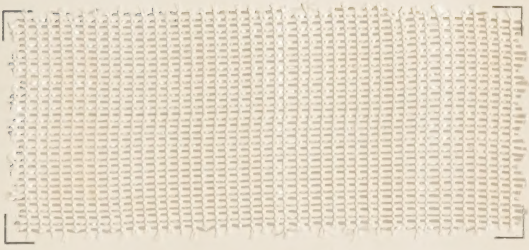
SPORT SATIN

61. Gray

61A.  Finished

MARQUISETTE

62. Gray

62-A.  Finished

"A Loom For Every Known Woven Fabric"

As the largest builders of fancy weaving equipment in the world, we are prepared to offer

Automatic Box Looms

for

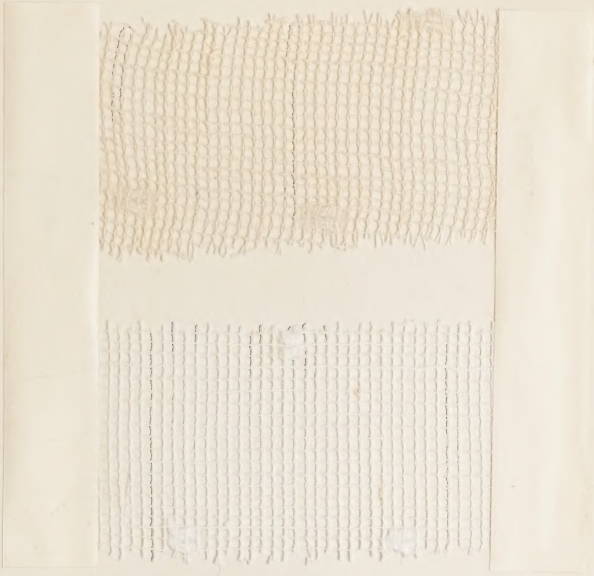
Cottons
Worsteds
Woolens
Silks
Rayons

Our experience and advice are at your disposal

CROMPTON & KNOWLES LOOM WORKS
WORCESTER, MASS.
PROVIDENCE, R.I. PHILADELPHIA, PA. ALLENTOWN, PA. PATERSON, N.J.

MARQUISETTE SPOT

63. Gray



63-A. Finished

FANCY LENO

64. Gray

64-A. Finished

FRANKLIN INSTITUTE
PHILADELPHIA

Dirty Warp Ends, Oily Warp Ends—Carelessness.

Kinky Filling—Too much twist. Filling not properly conditioned. Filling fork not properly adjusted.

Filling Cut in the Selvage, Sometimes Known as "Temple Holes"—Too much tension on the filling when the bobbin or cop is nearly empty. Harnesses not set correctly.

Temple Marks and Temple Pulling Filling—Temple roll not turning. Temple teeth bent.

Tight, Slack and Raw Selvage—Uneven take-up roll. Warp yarn built up unevenly on beam. Beam heads not true. Beam gudgeons not true. Selvage ends not drawn correctly.

Rayon Yarn, When Used in Cloth, Having a More Brilliant Appearance in Certain Portions of Goods than in others, Technicllly termed "Shiners"—This results from the rayon yarn being unduly stretched, and may be caused by yarn catching on knots when winding or unwinding, by the weaver breaking the yarn by pulling it instead of cutting it when trimming off loose ends or picks, and also by tension in the shuttles.

Loose Ends on the Cloth—Carelessness in the weaving and trimming.

Warp Stripes Weaving Alternately Tight and Slack—Unbalanced beams and spools.

Stiff Places in the Cloth—Too much size.

Certain Ends Pulling Tight in Places—Crossed warp ends. Hard sizing.

Slack Ends in the Warp—Broken ends not taken care of in the slashing.

Hard Sized Sections Extending Across the Cloth—Size roller on slasher not being raised when slasher is not in operation.

Neps or Leaf in the Yarn—Poor picking. Poor carding.

Slugs in the Yarn—Clearers not cleaned often enough. Allowing fly waste to collect on the roving and yarn when cleaning the machinery.